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BRAD A. BADERTSCHER
Overvaluation and the Choice of Alternative Earnings Management Mechanisms

BRAD A. BADERTSCHER, S. PAUL HRIBAR, and NICOLE THORNE JENKINS
Informed Trading and the Market Reaction to Accounting Restatements

JASMIJN C. BOL
The Determinants and Performance Effects of Managers' Performance Evaluation Biases

GUS DE FRANCO, M. H. FRANCO WONG, and YIBIN ZHOU
Accounting Adjustments and the Valuation of Financial Statement Note Information in 10-K Filings

LESLIE G. ELDENBURG, KATHERINE A. GUNNY, KEVIN W. HEE, and NAOMI SODERSTROM
Earnings Management Using Real Activities: Evidence from Nonprofit Hospitals

DAVID P. HUELSBECK, KENNETH A. MERCHANT, and TATIANA SANDINO
On Testing Business Models

CLIVE S. LENNOX and JEFFREY A. PITTMAN
Voluntary Audits versus Mandatory Audits

PAUL E. MADSEN
How Standardized Is Accounting?

M. CHRISTIAN MASTILAK
Cost Pool Classification and Judgment Performance

PAUL N. MICHAS
The Importance of Audit Profession Development in Emerging Market Countries

PANOS N. PATATOUKAS and JACOB K. THOMAS
More Evidence of Bias in the Differential Timeliness Measure of Conditional Conservatism

YEE SHIH PHUA, MARGARET A. ABERNETHY, and ANNE M. LILLIS
Controls as Exit Barriers in Multiperiod Outsourcing Arrangements

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(60)

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VOL. 86 SEPTEMBER 2011 No. 5

BRAD A. BADERTSCHER
Overvaluation and the Choice of Alternative Earnings Management Mechanisms 1491
BRAD A. BADERTSCHER, S. PAUL HRIBAR, and NICOLE THORNE JENKINS
Informed Trading and the Market Reaction to Accounting Restatements 1519
JASMIJN C. BOL
The Determinants and Performance Effects of Managers' Performance Evaluation Biases .. 1549
GUS DE FRANCO, M. H. FRANCO WONG, and YIBIN ZHOU
Accounting Adjustments and the Valuation of Financial Statement Note Information in 10-K Filings 1577
LESLIE G. ELDENBURG, KATHERINE A. GUNNY, KEVIN W. HEE, and NAOMI SODERSTROM
Earnings Management Using Real Activities: Evidence from Nonprofit Hospitals 1605
DAVID P. HUELSBECK, KENNETH A. MERCHANT, and TATIANA SANDINO
On Testing Business Models 1631
CLIVE S. LENNOX and JEFFREY A. PITTMAN
Voluntary Audits versus Mandatory Audits 1655
PAUL E. MADSEN
How Standardized Is Accounting? 1679
M. CHRISTIAN MASTILAK
Cost Pool Classification and Judgment Performance 1709
PAUL N. MICHAS
The Importance of Audit Profession Development in Emerging Market Countries 1731
PANOS N. PATATOUKAS and JACOB K. THOMAS
More Evidence of Bias in the Differential Timeliness Measure of Conditional Conservatism 1765
YEE SHIH PHUA, MARGARET A. ABERNETHY, and ANNE M. LILLIS
Controls as Exit Barriers in Multiperiod Outsourcing Arrangements 1795

BOOK REVIEWS, Stephen A. Zeff, Editor

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.... SHANNON W. ANDERSON 1835

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. . . . LAWRENCE D. BROWN **1843**

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P 32,764

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Overvaluation and the Choice of Alternative Earnings Management Mechanisms

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ABSTRACT: In this study I examine how the degree and duration of overvaluation affect management's use of alternative within-GAAP earnings management, restrictions on further exploitation of within-GAAP accruals management, and subsequent non-GAAP earnings management. Further, I examine how one type of earnings management segues into another type as overvaluation persists. I present evidence that the longer the firm is overvalued, the greater is the amount of total earnings management. I also find that managers engage in accruals management in the early stages of overvaluation before moving to real transactions management, in order to sustain their overvalued equity. Finally, I find that the longer a firm is overvalued, the more likely it is to engage in one of the most egregious forms of earnings management, non-GAAP earnings management. Collectively, the results suggest that the duration of firm overvaluation is an important determinant of managements' choice of alternative earnings management mechanisms.

Keywords: *sustained overvaluation; within-GAAP earnings management; non-GAAP earnings management.*

JEL Classifications: *M41; M43; M44.*

Data Availability: *Data are available from sources identified in the text.*

I. INTRODUCTION

This study examines how the degree and duration of overvaluation affect management's choice of alternative earnings management mechanisms. Specifically, I examine the relation between overvalued equity and management's use of alternative within-GAAP earnings management mechanisms and subsequent non-GAAP earnings management. Jensen's

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(2005) agency theory of overvalued equity suggests a "vicious bind" that ensnares managers of highly overvalued firms. That is, Jensen (2005) posits that, when a firm's stock becomes overvalued, managers engage in a variety of earnings management choices to sustain overvaluation. While earnings management activities often fall within the boundaries of GAAP, other more egregious earnings management activities can fall outside the boundaries of GAAP and in some cases, destroy firm value.

Jensen (2005) predicts that managers are likely to engage in three main types of earnings management practices in order to meet the unrealistic performance expectations incorporated in an overvalued stock price.[1] I term these alternative earnings management choices (1) Real Transactions Management (RTM), (2) within-GAAP Accruals Management (AM), and (3) Non-GAAP earnings management (NonGAAP). RTM refers to the purposeful altering of reported earnings in a particular direction by changing the timing or structuring of an operating, investing, or financing decision. Accruals management refers to the purposeful altering of accruals in a particular direction, either within-GAAP (i.e., AM) or outside the boundaries of GAAP (i.e., NonGAAP), that is achieved when managers adjust revenue or expense accruals to alter financial reports.

There is limited empirical evidence on the relation between the duration of overvaluation and management's choice of alternative earnings management mechanisms. To link the duration of overvaluation and the choice of earnings management, I examine both the within-GAAP and non-GAAP earnings management choices of firms that are able to sustain their overvaluation. I use multiple approaches to estimate overvalued equity, but my main analysis employs the residual income model of Edwards and Bell (1961) and Ohlson (1995) (hereafter, the EBO model). The EBO model that is based on analysts' forecasted earnings has been used extensively in finance and accounting literature.[2]

Earnings and earnings growth are key components in determining firm value. To the extent that earnings management artificially increases earnings and earnings growth expectations, earnings management can ultimately inflate firm value in order to sustain overvalued equity (Dechow et al. 2000). Moreover, Barton and Waymire (2004) find a link between earnings quality and overvaluation by providing evidence that suggests that poor information about a firm's fundamentals is related to overvaluation. In addition, prior research indicates that managers are aware of the opportunities to manage earnings (Nelson et al. 2002, 2003), investors are unlikely to see through earnings management (Sloan 1996; Xie 2001), and that managers are often rewarded for engaging in earnings management that allows the firm to meet or beat analysts' targets (Myers et al. 2007).

Overvalued firms have strong incentives to sustain their overvalued equity, such as increasing the welfare of the manager with more profitable stock options or bonuses tied to the firm's performance. Given these various incentives, I examine the link between the duration of overvaluation and the likelihood of a firm continuing to engage in within-GAAP earnings management. Specifically, I predict that the longer a firm is overvalued, the more likely it is that the firm will engage in within-GAAP earnings management. If at some point the overvalued firm is no longer able to engage in within-GAAP earnings management, then I predict that such a firm will likely segue to non-GAAP earnings management in order to report the high performance demanded by the market year after year. In summary, this study investigates how the degree and duration of firm overvaluation affect management's choice of alternative earnings management mechanisms and sheds light on how one type of earnings management segues into another in order to sustain overvaluation.

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[1] Fan et al. (2010) examine the use of classification shifting as another type of earnings management. Although not explored in this study, they find evidence that classification shifting is more prevalent when the ability of managers to manipulate accruals appears to be constrained.

[2] See, for example, Frankel and Lee (1998), Lee et al. (1999), D'Mello and Shroff (2000), and Dong et al. (2006).

Both univariate and multivariate results are consistent with my predictions about how overvaluation affects a manager's choice of earnings management. I find that the longer a firm is overvalued, the greater is the amount of total within-GAAP earnings management exhibited by the firm. More interestingly, I find that overvalued firms initially engage in AM, but at some point run out of AM choices and resort to RTM. In other words, my results suggest that, to sustain overvaluation, firms transition from one type of earnings management to another rather than using only one type. Moreover, I find evidence that firms with sustained overvaluation are more likely to be restricted in their ability to engage in further AM, leading them to engage in more drastic and costly forms of RTM.

Once within-GAAP earnings management options have been exhausted, my findings indicate that some firms resort to the most egregious form of earnings management: non-GAAP earnings management. Specifically, results show that early in the overvaluation phase, managers engage in AM followed by RTM. However, the longer a firm is overvalued, the more likely the firm is to engage in non-GAAP earnings management. Moreover, I find that prior to engaging in NonGAAP, the majority of the firms are overvalued and exhibit extensive use of RTM, likely turning to non-GAAP earnings management as a last resort.

The underlying assumption behind my tests is that overvaluation leads to earnings management. Although this assumption is consistent with Jensen's (2005) agency theory of overvalued equity, it may not always hold. For instance, it is plausible that the manager initiated some type of earnings management behavior that led to overvaluation. Therefore, I conduct a series of endogeneity tests to shed more light on this issue and its potential impact on my results. However, irrespective of the source of overvaluation, my results are still informative to regulators, investors, audit committees, and financial analysts who seek to better understand the role that sustained overvaluation plays in a manager's accounting choice behaviors.

This study contributes to the literature on overvaluation and earnings management in several important ways. First, I extend and empirically test Jensen's (2005) agency theory of overvalued equity. Specifically, I not only examine whether firms that are overvalued engage in different types of earnings management, but also consider the role that duration plays in the manager's decision to engage in a variety of within-GAAP and non-GAAP earnings management choices. Prior research has provided empirical evidence consistent with Jensen's (2005) conjecture. For instance, Efendi et al. (2007) examine the role of overvalued equity, stock option compensation, and restatements. They demonstrate that restatement firms exhibit signs of being overvalued in the years prior to engaging in non-GAAP earnings management and provide insight into the incentives that push managers to take actions to sustain their overvalued stock prices.

Although prior research has not explicitly examined the collective use of the three main types of earnings management (e.g., RTM, AM, NonGAAP) and the duration of overvaluation, prior research has investigated the use of RTM and AM in a variety of other settings. For instance, Cohen et al. (2008) find that AM increased prior to the passage of the Sarbanes-Oxley Act (SOX) followed by a significant decline. However, they document that the level of RTM declined prior to SOX but has increased significantly since, suggesting a switch from AM to RTM after its passage. Cohen and Zarowin (2010) examine whether firms use both RTM and AM around seasoned equity offerings (SEOs) and the implications this has on subsequent operating performance. Further, Gunny (2010) examines the use of AM and RTM and finds that RTM is positively associated with firms just meeting earnings benchmarks. The current study extends this growing stream of literature by examining the role that overvaluation plays in the choice between RTM and AM.

In addition, my study builds upon and extends recent research by Chi and Gupta (2009), who examine the relation between overvaluation and accruals management, finding that overvaluation intensifies accruals management. Although our studies are related, my study focuses on how sustained overvaluation affects management's use of not only AM, but also RTM. Further, I specifically examine firms that engage in the most egregious form of earnings management to provide corroborating evidence on the effect of sustained overvaluation on alternative earnings management choices. Since mechanisms of earnings management are not equally costly or equally effective, examining only one earnings management choice at a time cannot lead to definitive conclusions regarding how or why managers decide to manage earnings (Fields et al. 2001; Cohen et al. 2008; Cohen and Zarowin 2010). More importantly, I examine how one type of earnings management transitions into another in order to sustain overvalued equity. The accounting and finance literature continues to examine determinants of managements' earnings management decisions. This study contributes to this area of research by suggesting that sustained overvaluation plays an important role in that decision process.

My study also fills a void in the earnings management literature identified by Jiambalvo (1996), who calls for research that examines whether firms with limited within-GAAP earnings management turn to non-GAAP earnings management in their efforts to manage earnings. Prior research examines, in different settings, the order of within-GAAP earnings management, but, to my knowledge, no study has examined the three different types of earnings management (AM, RTM, and NonGAAP) in the same setting. For example, Barton (2001) provides evidence that managers use derivatives and discretionary accruals as partial substitutes for smoothing earnings. Moreover, Pincus and Rajgopal (2002) find that managers of oil- and gas-producing firms first determine the extent to which they will use derivatives to hedge oil price risk, and then manage residual earnings volatility by trading off abnormal accruals and derivatives. The Pincus and Rajgopal (2002) study and my study complement each other in that they examine the use of RTM and AM throughout the year, while my study extends this to multiple accounting periods. Pincus and Rajgopal (2002) find that firms tend to use operating decisions to produce the earnings they expect and resort to AM to meet short-term performance benchmarks. Conversely, my study examines the behavior of firms over the longer term. Overall, the results of this study provide a more complete picture of the relation between sustained overvaluation and the use of different types of within-GAAP and non-GAAP earnings management.

Section II offers further motivation for the study and examines causes of overvaluation. Section III describes the earnings management choices and the research design. Section IV presents the sample selection. Section V discusses the descriptive statistics, describes the study's results, and tests for potential endogeneity. Section VI concludes by discussing the implications of the findings and suggesting ideas for future research.

II. MOTIVATION AND OVERVALUATION

Motivation

In Jensen's (2005) agency theory of overvalued equity, excessively high stock valuations induce managers to engage in earnings management with the purpose of sustaining upward trends in earnings and stock price. Jensen (2005) posits that when a firm's stock price becomes overvalued (i.e., 100%—or even 1,000%—above underlying firm intrinsic value), the potential for conflicts of interest between managers and owners increases. According to Jensen (2005, 7), overvaluation sets in motion certain organizational forces, including earnings management, that lead to the destruction of part, or all, of the core value of the firm:

> Corporate managers and the financial markets have been playing a game similar to the budgeting game. Just as managers' compensation suffers if they miss their internal targets, CEOs and CFOs know that capital markets will punish the entire firm if they miss analysts' forecasts by as much as a penny ... Generally, the only way for managers to meet those

> expectations year in and year out is to cook their numbers to mask the inherent uncertainty in their business. And that cannot be done without sacrificing value.

The managers of overvalued firms not only resist market correction of overvalued stock prices, but also actually attempt to prolong overvaluation by engaging in earnings management that increases reported income. Managers do not seek overvaluation for its own sake but rather because it is an intermediate step toward increasing the welfare of the manager, through incentives like stock options and bonuses that are often tied to firm performance. In other words, the more overvalued the equity, the greater the incentive to sustain such overvaluation because the managers' wealth is tied to the firm's stock price. This renders little incentive for the manager to correct the overvaluation. At the same time, lack of incentive does not imply that managers will engage in earnings management because, as outlined more specifically below, the costs of earnings management can be extremely high for both the manager and the firm.

As Jensen (2005) argues, the source of the agency problem is that managers cannot, except by pure luck, produce the earnings performance required to sustain an overvalued stock price without engaging in within-GAAP and/or non-GAAP earnings management. My underlying assumption, which builds upon Jensen's (2005) agency theory of overvalued equity, is that overvaluation leads to earnings management. I posit that firms with the highest overvalued equity and those that exhibit sustained overvaluation have the strongest incentives to continue to meet or exceed the market's high performance expectations and, therefore, are the most likely to engage in more aggressive and potentially more costly earnings management. As a result, I predict that the longer the firm is overvalued, the greater is the amount of total within-GAAP earnings management.

Within-GAAP earnings management consists of two components, AM and RTM. At some point, the firm is likely to run out of one or both of these options. As such, it is not obvious that the relation between overvaluation and each *specific* within-GAAP earnings management will always be increasing as the duration of overvaluation increases. As explained shortly, the reasons for choosing one type or another differ, as does the order in which they may occur. Therefore, in order to obtain an accurate understanding of the relation between overvaluation and earnings management, it is important to examine *both* the total within-GAAP earnings management and its specific components. This partitioning of the data allows a clearer determination of whether one type of earnings management is more prevalent than another and at what point in the overvaluation process one type transitions into another.

Prior research has also indicated that, once a firm becomes constrained in its ability to manage earnings, it either stops managing earnings or engages in a different type of earnings management (Ettredge et al. 2010). In order to provide additional evidence on how earnings management choices interact as the duration of overvaluation increases, I examine a subset of firms that are likely constrained in their ability to overstate earnings through accruals prior to being overvalued. In other words, if the duration of overvaluation is forcing managers to engage in earnings management, as suggested by Jensen (2005), then one would predict that, as the duration of overvaluation increases, this subset of constrained accrual management firms will likely resort to other types of earnings management more quickly relative to those that have the continued flexibility to manage earnings through accruals. As a result, I predict that firms with less operating flexibility to overstate earnings through accruals will resort to RTM and NonGAAP earlier in the overvaluation process, relative to firms that are not constrained.

Finally, I examine the relation between overvaluation and the costliest form of earnings management, NonGAAP. Prior research has indicated that firms that engage in non-GAAP earnings management are likely overvalued (Efendi et al. 2007). However, what is not known is whether the duration of overvaluation plays an important role in the firm's decision to engage in NonGAAP. NonGAAP has the advantage of allowing managers to engage in large amounts of earnings management, but the costs are extremely high. Given the high costs, I predict that managers will segue into using NonGAAP only after a sustained period of overvaluation.

Causes of Overvaluation

There is a variety of reasons a firm can be overvalued, yet the causes of overvaluation are difficult to pinpoint and identify empirically. While prior finance and accounting research does not identify the exact cause of overvaluation, it does provide evidence that overvalued firms are associated with a pattern of high earnings growth expectations (Jensen 2005); a history of mergers and acquisitions (Travlos 1987; Moeller et al. 2004); and greater analyst dispersion, which can lead to mispricing and, in particular, overpricing due to the differing opinions of firm value (Anderson et al. 2005).

Measurement of Overvaluation

Jensen (2005, 5) states that equity is overvalued when "a firm's stock price is higher than its underlying value." In other words, it occurs when the ratio of stock price to underlying value exceeds 1. To estimate a firm's underlying value, I use the EBO residual income approach, following Edwards and Bell (1961) and Ohlson (1995). I empirically estimate the EBO model following Frankel and Lee (1998), as follows:

$$V_t = B_t + \frac{(FROE_t - r_e)}{(1+r_e)}B_t + \frac{(FROE_{t+1} - r_e)}{(1+r_e)^2}B_{t+1} + \frac{(FROE_{t+2} - r_e)}{(1+r_e)^2 r_e}B_{t+2}, \tag{1}$$

where B is the book value and $FROE$ is the future return on equity derived from I/B/E/S consensus earnings-per-share (EPS) estimates. Since year-end book value is dependent on current-year return on equity (ROE), I use a sequential process to estimate future ROEs. The cost of equity capital, r_e, is based on industry-based discount rates derived from the Fama and French (1997) four-factor risk model.

Prior finance and accounting research has used the EBO model to calculate a firm's intrinsic value (V). For example, Frankel and Lee (1998) and Dong et al. (2006) find that a firm's intrinsic value is highly correlated with contemporaneous stock prices, explaining more than 70 percent of the cross-sectional variation in stock prices. Moreover, the P/V (price-to-value) ratio is a good predictor of cross-sectional returns, as P/V predicts cross-sectional returns as well as the book-to-market ratio. Furthermore, Frankel and Lee (1998) find that low P/V firms tend to earn higher long-term returns for reasons that cannot be attributed to differences in market betas, firm size, or book-to-market ratio.

In order to identify overvalued firms and to measure the degree of overvaluation, I form annual portfolios on June 1 by ranking firms based on the P/V ratio,[3] where firms in the highest quintile rank of P/V indicate overvalued firms. To capture the notion of sustained overvaluation or duration of overvaluation, I identify firms that have been in the top quintile of P/V for 0, 1, 2, 3, 4, or 5 > consecutive years, where 5 > captures firms that are overvalued for 5 or more consecutive years.

III. EARNINGS MANAGEMENT CHOICES AND RESEARCH DESIGN

Earnings Management Choices

There are a myriad of earnings management choices, some within and others beyond the boundaries of GAAP, that can be used to disguise the true economic performance of a firm in order to sustain overvaluation. The flexibility of GAAP provides opportunities for managers to engage in earnings management that makes the firm appear less risky or more profitable than it really is (Fields et al. 2001; Graham et al. 2005). When deciding which type of earnings management to utilize, managers must consider both the expected costs and benefits of the alternative earnings management mechanisms. While potential benefits can include enhancing managers' welfare and disguising the underlying economic performance of the firm, the potential costs include (1) the decline in firm value that results from managers making suboptimal business decisions; (2) the decline in a firm's stock price that results when the market discovers accrual manipulation; and (3) the loss of reputation in the labor market that often accompanies managers who engage in aggressive earnings management (Palmrose et al. 2004; Desai et al. 2006). In summary, each accounting choice has costs and benefits. It is the net incentives (benefits minus costs) that ultimately determine management's choice of alternative earnings management mechanisms.

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[3] I also measure overvaluation using the approach of Rhodes-Kropf et al. (2005) and the results, untabulated, are similar.

I next examine the costs and benefits of each type of earnings management. First, accruals management, which occurs when managers adjust revenue or expense accruals to alter financial reports, is a popular choice because it has no first-order effect on cash flows and is therefore less likely to destroy long-term firm value. AM is attractive because it can be completed at period-end once the amount of pre-accrual management earnings is known. AM is also attractive because it can be done within the boundaries of GAAP. Depending on the AM choice, it may or may not be recognizable to investors, auditors, and regulators (Jiambalvo 1996; Sloan 1996; Xie 2001). Since the ambiguity of GAAP allows management to make judgments that can directly impact earnings, the detection cost of AM is likely to be relatively low. However, due to the reversing nature of accruals, a firm can become restricted in its ability to continue to engage in AM. This reversing nature of AM can be problematic, as the firm will have to overcome the potential reversal of last year's AM in order to have an impact on the current year's earnings.

An alternative earnings management choice is real transaction management, which refers to the purposeful altering of reported earnings in a particular direction by changing the timing or structuring of an operating, investing, or financing decision. One advantage that RTM has over AM is that it is not subject to auditor or governance constraints to the same degree as AM, such that the detection costs are comparatively low. For example, if management engages in RTM by cutting research and development (R&D) expenses, such activities will not be scrutinized by the auditor or regulators. However, the downside of engaging in RTM is that it impacts cash flows. As a result, RTM is more costly than AM from a cash flow perspective because of its adverse impact on optimal business operations and its potential to destroy long-term firm value. Therefore, it is unreasonable to assume that RTM is always less costly, both *ex ante* and *ex post*, than AM. Consequently, managers are unlikely to rely solely on RTM, though they are increasingly likely to engage in RTM after they have exhausted their AM choices.

A third earnings management choice that managers can utilize is non-GAAP earnings management. Jiambalvo (1996) posits that non-GAAP manipulations are less likely to be identified by stakeholders than within-GAAP manipulations. It follows that managers choose NonGAAP because it is more likely to go undetected (Jiambalvo 1996). From a valuation perspective, one can argue that, if the probability of detecting NonGAAP is low, then it may actually be less costly than RTM, due to RTM potentially destroying firm value. Another advantage of NonGAAP is that it enables management to manage earnings by large amounts (Badertscher et al. 2010), therefore enabling management to achieve specific benchmarks in order to sustain overvalued equity. Despite the advantages of NonGAAP, it is the most costly form of earnings management because of the capital market consequences and the reputational costs that managers carry in managerial labor markets (Desai et al. 2006).[4]

Earnings Management Proxies

I identify three empirical proxies for RTM based on prior research. The first is modeling cash flow from operations, which includes accelerating the timing of sales or generating unsustainable sales via increased price discounts or more lenient credit terms. Following Roychowdhury (2006), I express normal cash flow from operations as a linear function of sales and prior period change in sales.

I estimate the following cross-sectional regression within each three-digit industry by year:

$$\frac{CFO_{j,t}}{A_{j,t-1}} = \frac{\alpha_0}{A_{j,t-1}} + \alpha_1\left(\frac{S_{j,t}}{A_{j,t-1}}\right) + \alpha_2\left(\frac{\Delta S_{j,t}}{A_{j,t-1}}\right) + \varepsilon_{j,t}, \tag{2}$$

where $CFO_{j,t}$ is cash flow from operations, $A_{j,t}$ equals total assets as of the beginning of year t for firm j, $S_{j,t}$ equals net sales for firm j in year t, and $\Delta S_{j,t}$ equals net sales for firm j in year t minus net sales for year $t-1$. In each firm-year, abnormal cash flow from operations (*AbnCFO*) is the actual CFO minus the "normal" or expected CFO calculated using estimated industry-level coefficients from Equation (2).[5]

The second proxy for RTM is the abnormal decrease in the amount of discretionary expenditures, *AbnDISEXP*. Prior research suggests that managers cut discretionary expenses in order to manage earnings. In a survey of CFOs, Graham et al. (2005) find that 80 percent of CFOs surveyed indicate a willingness to engage in RTM by delaying discretionary spending in areas of R&D, advertising, and maintenance in order to achieve an earnings target.

Following Roychowdhury (2006), I estimate the following regression within each three-digit industry by year:

$$\frac{DISEXP_{j,t}}{A_{j,t-1}} = \frac{\alpha_0}{A_{j,t-1}} + \alpha_1\left(\frac{S_{j,t}}{A_{j,t-1}}\right) + \alpha_2\left(\frac{\Delta S_{j,t-1}}{A_{j,t-1}}\right) + \varepsilon_{j,t}, \tag{3}$$

where $DISEXP_{j,t}$ equals R&D expense plus advertising expense plus selling, general, and administrative expenses for firm j in year t. All other variables are as defined previously. For every firm-year, *AbnDISEXP* is the actual *DISEXP* minus the "normal" *DISEXP* calculated using estimated coefficients from the corresponding industry-year model.

The third proxy for RTM is abnormally high inventory production (*AbnPROD*). To manage earnings upward, managers can overproduce inventory in order to lower cost of goods sold by allocating more fixed manufacturing overhead to inventory. To capture the amount of *AbnPROD*, I rely on Roychowdhury's (2006) model to estimate the normal level of production costs within each three-digit industry by year:

$$\frac{PROD_{j,t}}{A_{j,t-1}} = \frac{\alpha_0}{A_{j,t-1}} + \alpha_1\left(\frac{S_{j,t}}{A_{j,t-1}}\right) + \alpha_2\left(\frac{\Delta S_{j,t}}{A_{j,t-1}}\right) + \alpha_3\left(\frac{\Delta S_{j,t-1}}{A_{j,t-1}}\right) + \varepsilon_{j,t}, \tag{4}$$

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[4] Recent research suggests that the probability of detecting NonGAAP has likely increased due to the implementation of SOX (Cohen et al. 2008), likely resulting in fewer NonGAAP violations (Badertscher and Burks 2011).

[5] For the RTM and AM proxies, I require a minimum of ten observations in each three-digit industry-year in order to estimate RTM and AM. If ten observations are not available, then I conduct the analysis using a two-digit industry-year specification.

where $PROD_{j,t}$ equals the cost of goods sold plus change in inventory for firm j in year t. All other variables are as previously defined.

Finally, consistent with Bartov and Cohen (2007), I construct an overall proxy for the amount of *RTM* by summing *AbnCFO*, *AbnDISEXP*, and *AbnPROD*. Larger values of *RTM* suggest greater use of RTM to manage earnings. Prior to summing, I multiply *AbnCFO* and *AbnDISEXP* by -1 so that higher levels of *AbnCFO* and *AbnDISEXP* proxy for higher levels of RTM. I do not multiply *AbnPROD* by -1 because higher abnormal production costs imply higher levels of RTM.[6]

To proxy for accruals management, I estimate accruals management (AM) using the Kothari et al. (2005) performance-matched modified Jones model. This proxy is supported by the findings in Jones et al. (2008), who show that discretionary accruals are indeed associated with the magnitude of fraud. To estimate "normal" or expected accruals, I estimate the following regression within each three-digit industry by year:

$$\frac{TACC_{j,t}}{A_{j,t-1}} = \lambda 1\frac{1}{A_{j,t-1}} + \lambda 2\frac{(\Delta S_{j,t} - \Delta AR_{j,t})}{A_{j,t-1}} + \lambda 3\frac{PPE_{j,t}}{A_{j,t-1}} + \varepsilon_{j,t}, \tag{5}$$

where $\Delta AR_{j,t}$ equals the change in accounts receivable for year t, and $PPE_{j,t}$ equals the gross value of property, plant, and equipment for year t. All other variables are as previously defined. Performance-adjusted abnormal accruals (*AM*) are calculated as the difference between firm j's abnormal accruals and the median abnormal accruals of firms in the same industry return-on-assets quintile, where the median calculation excludes firm j.[7] In addition to *RTM* and *AM*, I also combine *RTM* and *AM* into one measure, *EM*, to capture total within-GAAP earnings management.

Accruals management can also transgress the boundaries of GAAP. Therefore, I provide corroborating evidence on the relation between overvaluation and earnings management by examining a sample of firms that have engaged in the most egregious form of earnings management, non-GAAP earnings management. Because I am interested in examining the role of non-GAAP earnings management, I focus only on those restatements that raise questions about the quality of financial reporting and not on restatements that reflect unimportant accounting errors. Specifically, I focus my analysis on those firms for which the restatement is described as an accounting irregularity as opposed to an accounting error, and for which the restatement is the result of income-increasing earnings management.

Research Design

My research design is framed to be consistent with Jensen's (2005) view that overvaluation drives managers to manipulate earnings. In other words, I assume that overvaluation leads to earnings management choices. Specifically, I estimate the following regression:

$$\begin{aligned} &\mathit{Earnings\ Management}_{i,t} \\ &\quad = f\Big(\sum \alpha_{1-5} OVER(i)_{i,t} + \mathit{Earnings\ Management\ Specific\ Control\ Variables} \\ &\qquad + \mathit{Corporate\ Governance\ Control\ Variables} + \mathit{General\ Control\ Variables}\Big), \end{aligned} \tag{6}$$

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[6] Since both *AbnDISEXP* and *AbnPROD* are based on accruals, there is the possibility of overlap between my RTM and AM proxies. However, consistent with prior literature (Roychowdhury 2006; Cohen and Zarowin 2010) I view AM and RTM as distinct, with AM having no direct cash flow consequences and RTM affecting cash flows.

[7] My measure of performance-matched accruals varies slightly from Kothari et al. (2005) because I subtract the median abnormal accruals of firms in the same industry ROA quintile, instead of subtracting the abnormal accruals from a matched ROA firm.

where earnings management is equal to either *EM*, *AM*, *RTM*, or *NonGAAP*. In Equation (6), *OVER*(i) is an indicator variable equal to 1 if the firm has been in the top quintile of *P/V* for (i) consecutive years, and 0 otherwise. For instance, *OVER2* is equal to 1 if the firm is overvalued for two consecutive years, and all other *OVER*(i)s are 0.

In addition to the *OVER*(i) indicator variables, I also include a series of control variables, some of which prior research has shown are important in explaining a particular type of earnings management choice (i.e., earnings management-specific control variables). Others variables serve as controls for all types of earnings management (i.e., corporate governance controls and general control variables).

The first AM-specific control is the number of analysts (*AF*) following the firm. Healy and Palepu (2001) suggest that analysts play a monitoring role and therefore constrain AM. Following Francis et al. (1994), I include an indicator variable (*LITIGATION*) set equal to 1 if the firm is in a high litigation risk industry. Finally, Teoh et al. (1998) find that managers engage in AM at the time of an SEO. I ascertain whether a firm engaged in an SEO by examining the Securities Data Company New Issue database and include an indicator variable (*SEO*) if the firm engaged in a seasoned equity offering in year *t*.

RTM-specific control variables include those that prior research indicates are related to the use of RTM. Zang (2012) finds that firms facing higher industry competition, with lower market share, or a threat of bankruptcy are less likely to deviate from the optimal levels of spending and are therefore less likely to engage in RTM. I proxy for higher industry competition using the Herfindahl index (*HERF_INDX*). Second, market leaders are likely to view RTM as less costly since it is not likely to erode their firms' competitive advantage. I use market share (*MRK_SHR*) as a proxy for market leaders. Finally, firms on the cusp of bankruptcy are less likely to engage in RTM. I use a variant of Altman's Z-score (Altman 1968) to proxy for a firm's financial condition (*DISTRESS*). See Appendix A for a complete description of how I calculate the RTM-specific control variables.

Turning to NonGAAP-specific controls, prior research indicates that the amount of book-tax difference (*BTD*) is a useful tool in explaining non-GAAP earnings management, where *BTD* is equal to book income less taxable income scaled by lagged total assets (Badertscher et al. 2009). I also control for a number of governance variables that have been shown to constrain all types of aggressive financial reporting behavior. For instance, Efendi et al. (2007) find a positive relation between the CEO as the chairperson of the board and earnings management activities. I use *CEOBRD* to indicate whether the CEO is the chairperson of the board. In addition, compensation variables have been shown to be important determinants of earnings management decisions (Efendi et al. 2007; Cohen et al. 2008). I include the amount of the CEO's base salary (*SAL*); the ratio of the CEO's bonus divided by the total compensation received by the CEO (*BONUS*); the sum of restricted stock grants in the current period and the aggregate number of shares held by executives at year-end (*OWNER*); and the number of option grants in the current period and other unexercised options held by executives at year-end (*UN_OPTIONS*).

Finally, I include general controls that prior research has identified as important determinants of firms' earnings management decisions. I first control for the possibility that RTM and AM are substitutes because prior research shows that RTM and AM act as substitutes for each other (Zang 2012; Cohen et al. 2008). That is, if the dependent variable is *AM* (*RTM*), then I control for the amount of *RTM* (*AM*).

Barton and Simko (2002) and Baber et al. (2011) provide evidence that the balance sheet restricts future earnings management by showing that firms with bloated balance sheets are more likely to miss earnings forecasts. They contend that firms with aggressive accounting policies are more likely to exhibit balance sheet bloat in the future. Hirshleifer et al. (2004) provide evidence that net operating assets (NOA), a proxy for balance sheet bloat, is a strong negative predictor of long-run stock returns. Further, Ettredge et al. (2010) find that managers exhaust allowable within-GAAP accounting options before engaging in non-GAAP accounting options. Such evidence suggests that balance sheet bloat (*BLOAT*) is an important variable in explaining the use of earnings management.

To proxy for auditors' reputation, I use an indicator variable (*BIGAUD*) that equals 1 if the firm's auditor is one of the Big 8. Badertscher et al. (2010) suggest that firms that meet or beat earnings targets (MBE) are more likely to engage in earnings management. In addition, research shows that earnings management is related to firm performance and so I include *ROE* as a control variable for all types of earnings management. Finally, Cohen et al. (2008) provide evidence that the choice of earnings management differs from the pre-SOX to post-SOX era. Therefore, I include an indicator variable (*SOX*) equal to 1 for years 2002 onward, and 0 otherwise. Consistent with Cohen et al. (2008), I also include ΔGDP to control for the effect of economic activity on earnings management, because what might be classified as earnings management may, in fact, be a consequence of changing economic conditions.

The coefficients of interest in Equation (6) are α_1 through α_5. By examining the coefficients on α_1 through α_5, one can determine whether duration affects within-GAAP and non-GAAP earnings management choices. A pattern of positive and statistically significant coefficients on $OVER(i)$ would be consistent with firms continuing to engage in earnings management at varying lengths of overvaluation. More interesting is whether the coefficients of $OVER(i)$ are positive and increasing in i. A coefficient on $OVER(i+1)$ that is greater than the coefficient on $OVER(i)$ when *EM* or *NonGAAP* is the dependent variable would be consistent with overvaluation intensifying the use of earnings management. However, it is unclear whether a similar pattern will exist for either *RTM* or *AM* because firms may use both RTM and AM tools throughout the overvaluation process. Alternatively, firms may choose between the two mechanisms, using only the mechanism that is least costly for them. As a result, I also examine Equation (6) separately for *AM* and *RTM* so that I can examine which earnings management method the firm initially selects, as well as if and when the firm segues into a different earnings management choice.

IV. SAMPLE SELECTION

The initial sample of firms consists of all domestic nonfinancial companies. I require all firms to have Compustat data available for book value (#9, #34, and #60) in years t, $t-1$, and $t-2$; earnings before extraordinary items and discontinued operations (#237) in years t and $t-1$; dividends (#21) in years t and $t-1$; and stock prices and shares outstanding data for fiscal year-ends t and $t+1$ from Center for Research in Security Prices (CRSP). Finally, I require that firms have both one-year-ahead and two-year-ahead earnings-per-share forecasts from I/B/E/S. I further restrict the sample to firms with fiscal year-ends between June and December, inclusively. I use I/B/E/S forecasts issued in May to ensure that forecasted earnings correspond to the correct fiscal year. The I/B/E/S mean (also called consensus) forecast from the May statistical period of year t is determined from analyst forecasts on file with I/B/E/S as of the Thursday after the third Friday of each month. I remove all firms with negative book values because return on equity for these firms cannot be interpreted in economic terms. I eliminate all firms where the return on equity is greater than 100 percent and dividend payout ratios are greater than 100 percent. Finally, I eliminate all firms that have a stock price of less than $1 as of the end of June in year t, leaving a final sample from fiscal years 1994 to 2008 of 33,502 firm-years (5,844 firms).[8] I provide corroborating evidence by conducting additional analyses using variables from the ExecuComp database. The ExecuComp requirement further reduces the sample to 19,775 firm-years (3,044 firms).[9]

I obtain the non-GAAP earnings management sample from three different sources that identify restatement announcements from 1997 to September 2008 (GAO-03-138, GAO-06-678, Audit Analytics). I limit the sample to only those restatements that raise questions about the quality of financial reporting—i.e., those firms whose restatements are described as accounting irregularities as opposed to accounting errors. My initial sample contains all accounting restatements from the GAO (2002, 2006) database that Hennes et al. (2008) identify as arising from accounting irregularities. The GAO database contains accounting restatements announced between January 1999 and September 2005. I extend this sample by including additional accounting irregularities identified by Audit Analytics from October 2005 to December 2008. Therefore, my final sample is a comprehensive sample of accounting irregularities spanning 11 years.

To reach my final sample, I start with 847 restatements identified as the result of accounting irregularities between 1997 and 2008. I eliminate 253 restatements due to missing Compustat/CRSP/I/B/E/S data in the year $t-2$, $t-1$, t, or $t+1$. I eliminate an additional 46 restatements due to the requirements outlined above for the Compustat population (e.g., fiscal year-ends between June and December). Finally, I eliminate another seven restatements because the GAO captures more than one announcement for the same restatement, yielding a final sample of 541 unique non-GAAP earnings management firms. For each non-GAAP firm, I collect the time period, often referred to as the misstatement period, that the firm engaged in non-GAAP earnings management. This allows me to examine whether the firm was able to use non-GAAP earnings management to sustain their overvalued equity.

V. DESCRIPTIVE STATISTICS AND EMPIRICAL RESULTS

Descriptive Statistics

Table 1 documents the relation between the degree of overvaluation and earnings management. Specifically, I construct quintile portfolios based on price-to-value (P/V) and examine the alternative earnings management mechanisms across each quintile. Table 1 reports characteristics of quintile portfolios formed on P/V. For each portfolio, I calculate firm-specific characteristics, buy-and-hold returns, and the earnings management mechanisms.

The right column of Table 1 reports the differences in means between the top (Q5) and bottom (Q1) quintiles. High P/V firms, which represent overvalued firms and can be found in Q5, have the highest market value of equity (*MVE*) and highest price-to-book (*P/B*) of any of the five quintile portfolios, but the difference between Q5 and Q1 is not statistically different. Further, the difference between Q5 and Q1 is not significantly different for book value (*B*), return on equity (*ROE*), or *P/B*.

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[8] More specifically, I obtain my sample by first starting with all domestic firm-years from 1994 to 2008 in the Compustat/CRSP merged file (293,229). I then delete firm-years for basic Compustat/CRSP data (#9, #34, #60, #237, #21, price < $1, *RET12*) in years t, $t-1$, and $t-2$ (198,434). I then exclude financial and utility firms (27,912). Next, I remove firm-years due to missing basic I/B/E/S data for one-year-ahead and two-year-ahead EPS (26,833). I then exclude firms with fiscal year-ends between June and December, inclusively (4,562). Finally, I remove firms with negative book values, whose return on equity is greater than 1 and whose dividend payout is greater than 1 (1,986), resulting in a final sample of 33,502 firm-years. My sample size is consistent with Frankel and Lee (1998).

[9] Since my starting year is 1994, it could be the case that a firm deemed overvalued in 1994 has actually been overvalued for two or more consecutive years. Therefore, to ensure that I have identified the correct number of consecutive years a firm is overvalued I look back in time to update the total number of years a firm in 1994 has been overvalued. This serves at my starting point for all years thereafter.

TABLE 1

Characteristics of Quintile-Portfolios Formed by P/V

	Q1 (low P/V)	Q2	Q3	Q4	Q5 (high P/V)	All Firms	Q5 − Q1 Diff.
Firm Characteristics							
MVE	2,617	2,822	3,514	3,658	3,843	3,646	1,226
B	7.39	9.72	10.53	8.58	7.17	9.38	−0.22
ROE	0.06	0.09	0.08	0.08	0.06	0.07	0.00
P/B	1.88	1.91	2.33	2.69	2.71	2.56	0.83
TA	8.20	8.21	8.19	7.97	7.84	8.21	−0.36*
P/V	0.67	0.96	1.31	1.76	3.01	1.33	2.34***
Buy and Hold Returns							
RET12	0.12	0.16	0.10	0.09	0.03	0.09	−0.07*
RET36	0.39	0.23	0.19	0.05	−0.16	0.18	−0.55***
Earnings Management Mechanisms							
EM	−0.032	−0.023	0.008	0.009	0.031	0.00	0.063***
AM	−0.010	−0.005	0.003	0.014	0.016	0.00	0.026***
RTM	−0.022	−0.018	0.005	−0.005	0.015	0.00	0.037**
NonGAAP	0.000	0.000	0.003	0.011	0.081	0.03	0.081***
Firm-years	6,700	6,701	6,701	6,700	6,700	33,502	

*, **, *** Signify that the observed difference between the extreme quintiles is significantly different from 0 at the 10 percent, 5 percent, and 1 percent levels, respectively (one-tailed).

This table reports the equal-weighted average characteristics of quintile portfolios formed at the end of June each year by price-to-value (P/V). Firm-years are the number of firm-years in each quintile and apply to all variables except *RET12* and *RET36*. Results in the "All Firms" column represent unconditional means. "Q5 − Q1 Diff." results represent differences in means between the top (Q5) and bottom (Q1) quintiles. See Appendix A for variable definitions.

However, the natural log of total assets (*TA*) is significantly different between Q5 and Q1, which is consistent with smaller firms more likely to be overvalued. Not surprisingly, *P/V* for Q5 and Q1 is significantly different with an average *P/V* of 3.01 for the top quintile compared to only 0.67 for the bottom quintile.

I next examine how the stock performs during the subsequent 12 and 36 months after I form portfolios. I compare the 12 (*RET12*) and 36 (*RET36*) month buy-and-hold returns and find that they are significantly different between Q1 and Q5. On average, returns over the subsequent 12 months are positive, but high P/V (Q5) firms have the lowest return of any quintile. Results over a three-year horizon are even stronger. Specifically, *RET36* is 44 percent for Q1 (low P/V) and only −0.03 percent for Q5 (high P/V). Consistent with Frankel and Lee (1998), these results provide evidence that P/V captures overvalued equity.[10]

Most importantly, Table 1 provides descriptive statistics for earnings management mechanisms across each quintile. For three of the four earnings management mechanisms, the amount of earnings management increases monotonically across the quintiles. Total within-GAAP earnings management (*EM*) ranges from −0.032 in Q1 to 0.031 in Q5, while the components of EM range from −0.010 in Q1 to 0.016 in Q5 for *AM* and from −0.022 in Q1 to 0.015 in Q5 for *RTM*. Finally, the results indicate that the majority of the non-GAAP sample is contained in the highest quintile of

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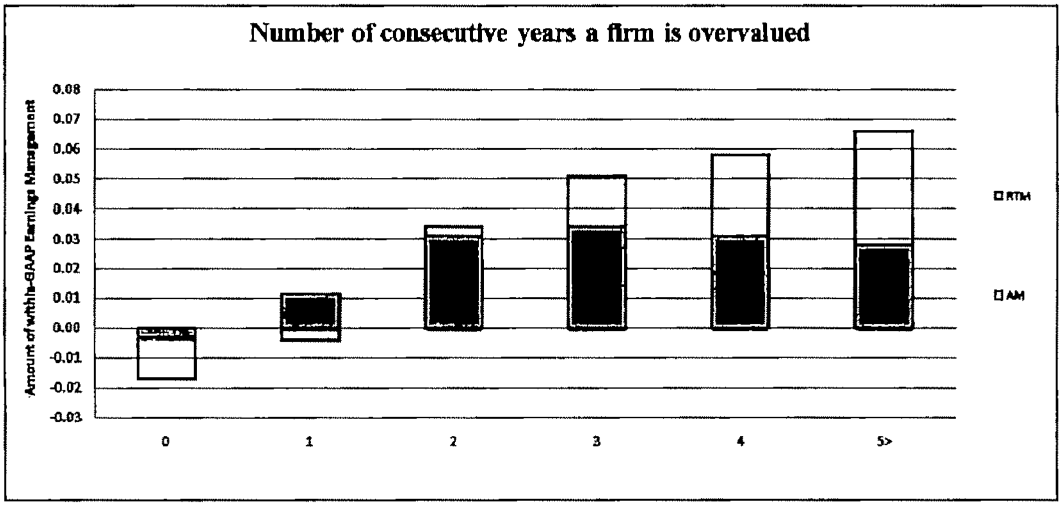
[10] The highest values of P/V are found from 1997 to 2001, consistent with the stock market bubble that occurred during the same time period. Collectively, these results are similar to those found in Frankel and Lee (1998) and illustrate the stability of the key model parameters over my sample period.

FIGURE 1
Duration of Overvaluation and Within-GAAP Earnings Management



This figure reports the equal-weighted average earnings management characteristics based on the number of consecutive years the firm is in the top quintile of price-to-value (P/V), where quintile portfolios are formed at the end of June each year by P/V. For example, 1 refers to all firms that are in the top quintile of P/V for one year, while 2 refers to all firms that are in the top quintile for two consecutive years. See Appendix A for variable definitions.

P/V, with 8.1 percent of the *NonGAAP* firm-years in the top quintile, while none of the NonGAAP firms appear in the bottom quintile. For each of the four proxies, the difference between Q1 and Q5 is statistically significant. In sum, the above analysis indicates that as a firm moves from undervaluation to overvaluation, the amount of earnings management increases.

Figure 1 provides the equal-weighted average earnings management characteristics based on the number of consecutive years a firm is in the top quintile of P/V. Along the horizontal axis, 0 refers to all firm-years that are not in the top quintile of P/V, while 1 refers to all firms that are in the top quintile of P/V for one year and 2 refers to all firms that are in the top quintile for two consecutive years. Notice that as a firm moves from not being overvalued to being overvalued for 5 > consecutive years, the amount of total earnings management increases substantially. Notably, in the early years of overvaluation, *AM* appears to be the earnings management method of choice. For example, *AM* increases dramatically in the first three years a firm is overvalued, and peaks when a firm is overvalued for three consecutive years. After three years it starts to decrease, possibly as accruals are reversing. On the other hand, *RTM* appears quite low during the first two years a firm is overvalued, but starting in the third year, *RTM* increases to the point where it comprises the largest percentage of total earnings management. In other words, the results suggest that firms engage in AM in the early years of being overvalued, but then turn to RTM as they attempt to sustain overvaluation.

Table 2 provides descriptive statistics for the variables used in the multivariate analysis. The mean (median) of *EM* is 0.000 (0.001), with an interquartile range of −0.041 to 0.045. The mean amount of *NonGAAP* is relatively low (0.027), which is consistent with prior research (Palmrose et al. 2004). Overall, the descriptive statistics are similar to those documented in prior research.

TABLE 2
Variable Distributions

	Obs.	Q1	Mean	Median	Q3	Std. Dev.
Earnings Management Mechanisms						
EM	33,502	−0.069	0.000	0.001	0.058	0.127
AM	33,502	−0.041	0.000	0.003	0.045	0.098
RTM	33,502	−0.087	0.000	−0.002	0.061	0.141
NonGAAP	33,502	0.000	0.027	0.000	0.000	0.097
Earnings Management-Specific Control Variables						
AM						
AF	33,502	2.000	6.440	4.000	9.000	6.020
LITIGATION	33,502	0.000	0.358	0.000	1.000	0.480
SEO	33,502	0.000	0.046	0.000	0.000	0.081
RTM						
HERF_INDX	33,502	0.066	0.149	0.104	0.190	0.102
MRK_SHR	33,502	0.004	0.069	0.019	0.071	0.111
DISTRESS	33,502	0.000	0.271	0.000	1.000	0.481
NonGAAP						
BTD	33,502	−0.087	−0.010	−0.014	0.064	0.164
Corporate Governance Control Variables						
CEOBRD	19,775	0.000	0.201	0.000	0.000	0.401
SAL	19,775	423	670	610	862	346
BONUS	19,775	0.042	0.208	0.157	0.268	0.182
OWNER	19,775	0.713	4.863	1.145	3.975	1.109
UN_OPTIONS	19,775	0.095	0.338	0.201	0.499	1.090
General Control Variables						
BLOAT	33,502	−0.201	0.007	0.023	0.408	1.020
BIGAUD	33,502	1.000	1.000	1.000	1.000	0.254
MBE	33,502	1.000	0.513	1.000	1.000	0.422
ROE	33,502	−0.279	0.000	0.000	0.175	0.226
LEV	33,502	0.013	0.196	0.169	0.321	0.183
IC	33,502	0.006	0.012	0.071	0.176	4.030
TA	33,502	4.985	8.210	6.146	7.460	1.330
SOX	33,502	0.000	0.480	0.000	1.000	0.470
ΔGDP	33,502	−0.013	0.031	0.021	0.041	0.095

See Appendix A for variable definitions.

Empirical Results

Table 3 provides a multivariate analysis of whether sustained overvaluation is associated with the total amount of within-GAAP earnings management (*EM*), accruals management (*AM*), and real transaction management (*RTM*). Panel A of Table 3 examines the full sample, while Panel B examines a subset of firms that are likely constrained in their ability to manage earnings through accruals.

The results reported in Table 3, Panel A indicate that overvalued firms engage in a significant amount of total within-GAAP earnings management (*EM*). Specifically, the coefficients on *OVER1* ($p = 0.059$) through *OVER5* > ($p = 0.001$) are all positive and significantly different from 0. This suggests that overvalued firms, irrespective of how long they have been overvalued, engage in

TABLE 3

Regression Results for Total Within-GAAP Earnings Management, Accruals Management, and Real Transactions Management

Panel A: All Firms

	EM				AM		RTM	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Intercept	0.016	0.000	0.014	0.044	−0.014	0.024	−0.010	0.257
Overvalued Equity								
OVER1	0.019	0.059	0.017	0.066	0.012	0.068	0.001	0.399
OVER2	0.027**	0.019	0.025**	0.033	0.020**	0.001	0.010	0.122
OVER3	0.036**	0.018	0.033*	0.024	0.029**	0.001	0.033***	0.044
OVER4	0.040**	0.001	0.042**	0.014	0.021	0.061	0.047**	0.001
OVER5 >	0.047*	0.001	0.043	0.001	0.016	0.162	0.053**	0.001
Earnings Management-Specific Control Variables								
AF	−0.016	0.387	−0.019	0.451	−0.009	0.570		
LITIGATION	−0.024	0.109	−0.028	0.101	−0.034	0.094		
SEO	0.057	0.031	0.048	0.048	0.048	0.044		
HERF_INDX	−0.071	0.106	−0.067	0.094			−0.073	0.119
MRK_SHR	−0.012	0.284	−0.019	0.224			−0.023	0.280
DISTRESS	0.008	0.056	0.011	0.042			0.016	0.021
Corporate Governance Control Variables								
CEOBRD			0.063	0.371	0.025	0.274	−0.015	0.406
SAL			0.088	0.112	0.070	0.166	−0.027	0.684
BONUS			0.058	0.049	0.054	0.059	0.074	0.097
OWNER			0.005	0.409	0.054	0.087	−0.063	0.080
UN_OPTIONS			0.054	0.059	0.205	0.019	−0.117	0.051
General Control Variables								
RTM					−0.261	0.063		
AM							−0.618	0.015
BLOAT	−0.021	0.034	−0.023	0.029	−0.028	0.007	0.033	0.014
BIGAUD	−0.018	0.057	−0.016	0.063	−0.015	0.084	0.002	0.745
MBE	0.103	0.042	0.086	0.061	0.122	0.033	0.043	0.134
ROE	0.031	0.168	0.038	0.251	0.041	0.198	−0.006	0.584
LEV	0.033	0.152	0.029	0.257	0.022	0.408	−0.093	0.182
IC	0.000	0.250	0.001	0.342	0.000	0.471	0.000	0.853
TA	0.017	0.053	0.009	0.022	0.009	0.071	−0.011	0.209
SOX	−0.007	0.384	−0.006	0.482	−0.025	0.021	0.019	0.057
ΔGDP	−0.039	0.193	−0.026	0.223	−0.011	0.242	0.012	0.231
Firm Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
Model Summary Statistics								
Adjusted R^2	0.237		0.278		0.191		0.546	
Obs.	33,502		19,775		19,775		19,775	

(continued on next page)

TABLE 3 (continued)

Panel B: Firms in the Top Quintile of Balance Sheet Bloat Prior to Being Overvalued[a]

	AM		RTM	
	Coefficient	**p-value**	**Coefficient**	**p-value**
Intercept	0.008	0.166	−0.002	0.798
Overvalued Equity				
OVER1	0.015	0.068	0.031	0.082
OVER2	0.006	0.268	0.044**	0.007
OVER3	0.007	0.302	0.053*	0.001
OVER4	0.014	0.131	0.021	0.344
OVER5 >	0.017	0.155	0.008	0.505
Earnings Management-Specific Control Variables				
AF	−0.003	0.641		
LITIGATION	−0.014	0.186		
SEO	0.028	0.094		
HERF_INDX			−0.044	0.246
MRK_SHR			−0.033	0.193
DISTRESS			0.019	0.044
Corporate Governance Control Variables				
CEOBRD	0.018	0.402	0.013	0.303
SAL	0.021	0.358	0.008	0.891
BONUS	0.033	0.280	0.054	0.076
OWNER	0.041	0.162	0.043	0.102
UN_OPTIONS	0.099	0.171	0.034	0.285
General Control Variables				
RTM	−0.268	0.089		
AM			−0.503	0.041
BIGAUD	−0.006	0.257	0.001	0.924
MBE	0.101	0.076	0.073	0.058
ROE	−0.021	0.471	0.003	0.671
LEV	0.005	0.861	0.043	0.508
IC	−0.001	0.509	0.000	0.706
TA	0.004	0.462	−0.009	0.359
SOX	−0.011	0.143	0.007	0.102
ΔGDP	−0.006	0.868	0.000	0.882
Firm Fixed Effects	Yes		Yes	
Year Fixed Effects	Yes		Yes	
Model Summary Statistics				
Adjusted R^2	0.177		0.420	
Obs.	3,522		3,522	

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*, **, *** Signify that the coefficient on *OVER*(*i*) is significantly greater than the coefficient on *OVER*(*i* − 1) at the 10 percent, 5 percent, and 1 percent levels, respectively (one-tailed). For example, *OVER2* (0.027) is significantly greater than *OVER1* (0.019).

One-tailed p-values are based on t-statistics that have been adjusted to control for the clustering by year and multiple firm observations. See Appendix A for variable definitions.

[a] Each year I rank firms on *BLOAT*, I then select the firms that are in the top quintile of *BLOAT* based on the year prior to the first year of overvaluation. If a firm was never deemed to be overvalued, I use the *BLOAT* rank from the first year it appeared in my sample.

P 32,764

significantly more earnings management relative to firms that are not overvalued. In order to determine whether EM increases in the duration of overvaluation, I compare the coefficients on *OVER*(i), where $i = 1$ to $5 >$. I find that the coefficients on *OVER*(i) are indeed increasing. For example, *OVER5* > is statistically greater than *OVER4* (as noted by the asterisk), which is statistically greater than *OVER3* (as noted by the double asterisk) and so on. This result suggests that sustained overvaluation is an important determinant of managements' earnings management decisions. I also provide the results after including the ExecuComp control variables. These results are similar, although slightly weaker. Table 3 supports the conclusion that the longer a firm is overvalued, the greater is the amount of total earnings management.

Coefficient estimates for the earnings management-specific control variables are in line with prior research. For instance, the coefficients on *LITIGATION*, *SEO*, and *DISTRESS* are all positive and strongly significant, consistent with Francis et al. (1994), Teoh et al. (1998), and Zång (2012). Of the five corporate governance control variables, *BONUS* and *UN_OPTIONS* are both positive and statistically significant, indicating the important role that compensation structure has on the amount of earnings management. Of the general control variables, *BLOAT*, *BIGAUD*, *MBE*, and *TA* are significantly positive, and other variables (*LEV* and *SOX*) have signs consistent with previous research.

Given that sustained overvaluation is positively associated with total earnings management, I partition EM into RTM and AM in order to see whether one type of earnings management is used more extensively to sustain overvaluation and, if so, at what point in the overvaluation process one method segues into the other. The results for AM reveal that the coefficients on *OVER1* through *OVER5* > are positive and significant, indicating that overvalued firms engage in more accruals management than firms that were deemed to not be overvalued, consistent with univariate results in Table 1. More interesting is that the coefficient on *OVER3* is statistically greater than *OVER2*, which is statistically greater than *OVER1*, but I find no evidence that the coefficient on *OVER5* > is statistically greater than *OVER4* or *OVER3*. In other words, it appears that the AM increases for the first three years and then levels off. This does not mean that firms stop using accruals management, but rather that the rate at which they use it no longer increases. This finding is consistent with the reversing nature of accruals, which makes it increasingly difficult to engage in increasing levels of AM.

Examining the AM-specific control variables indicates that two of the three are significant. Specifically, the coefficient on *LITIGATION* and *SEO* is positive and significant, while the coefficient on *AF* is negative but insignificant. In addition, three corporate governance and four general control variables are significant (*BONUS*, *OWNER*, *UN_OPTIONS*, *BLOAT*, *BIGAUD*, *TA*, and *SOX*). Taken together, the results suggest an interesting trend. The duration of overvaluation impacts the use of AM, but the use of AM decreases as the duration extends beyond three years.

Next, I examine the role that RTM plays in a firm's ability to sustain overvaluation. Results suggest that RTM does not play a major role until year three of overvaluation. Specifically, the coefficients on *OVER1* through *OVER5* > are all positive, but only the coefficients on *OVER3*, *OVER4*, and *OVER5* > are statistically significant. This suggests that, starting in the third year of overvaluation, firms start to engage in real transaction management. More importantly, the coefficient on *OVER5* > is statistically greater than that on *OVER4*, which is statistically greater than that on *OVER3*. This suggests that after a firm has been overvalued for three years, managers engage in increasing amounts of RTM. This result, coupled with my finding that the amount of AM levels off starting in year four, suggests that, after an extended period of overvaluation, firms lack the ability to engage in further AM and therefore resort to RTM. Such evidence is consistent with Graham et al. (2005), who find that managers are willing to engage in RTM to boost earnings and sustain their stock price, even though RTM is likely to destroy firm value. Interestingly, the coefficient on *BLOAT* is positive and significant for RTM. This finding, the first empirical evidence to document that *BLOAT* is linked to the use of RTM, complements the existing literature that links

BLOAT to NonGAAP (Ettredge et al. 2010) and suggests that *BLOAT* is also closely linked to the start of the use of RTM.

Examining the second and third columns of Table 3, Panel A together also reveals a substitution effect between *AM* and *RTM*. Specifically, the coefficient on *RTM* (*AM*) is negative and significant when the dependent variable is *AM* (*RTM*). This result is consistent with prior research (Cohen et al. 2008; Cohen and Zarowin 2010), and provides further evidence that firms trade off both types of earnings management when managing earnings. Taken together, the results from Figure 1 and Table 3, Panel A provide corroborating evidence that the longer the firm is overvalued the greater is the amount of within-GAAP earnings management. More importantly, AM is used early on in the overvaluation process, but due to the reversing nature of accruals and limits to the amount of AM in which a firm can engage, at about year three, the firm transitions to RTM.

Table 3, Panel B focuses on a subset of firms that are constrained in their ability to engage in further accruals management. Specifically, each year I rank firms on *BLOAT* and then assign a firm-specific rank based on the *BLOAT* rank prior to the first year of overvaluation. If a firm was never deemed to be overvalued, then I use the rank from the first year that firm appears in the sample. I then select all firms that are in the top quintile of *BLOAT* and examine how the different types of earnings management interact as duration increases for this group of firms that lack flexibility to overstate earnings through accruals. More specifically, Panel B allows me to examine whether overvalued firms that are limited in their ability to engage in further AM shift to RTM earlier in the duration of overvaluation.

Recall that the results in Table 3, Panel A suggest that, on average, firms engage in AM for about three years before segueing to RTM. However, the results in Panel B suggest that firms with limited AM options engage in less AM, and as the duration of overvaluation increases, they engage in RTM starting in the first year of overvaluation. Specifically, only the coefficient on *OVER1* is significant for AM, while the coefficients on *OVER1*, *OVER2*, and *OVER3* are significant for RTM. In addition, *OVER3* is greater than *OVER2*, suggesting that AM-constrained firms are engaging in more RTM earlier in the duration of overvaluation than is the case for the full sample. In other words, the results from Panel B find support that firms trade off the inability to engage in AM with increased amounts of RTM.

Overvaluation and Non-GAAP Earnings Management

Figure 2 depicts the percentage of misstatement firms that are deemed to be overvalued prior to, during, and after the first misstatement year.[11] Figure 2 indicates that over 62 percent of all misstatement firms are overvalued in the year prior to the first year the firm engaged in non-GAAP earnings management (depicted in the figure as year $t-1$). Also of interest is that *RTM* is the highest in year $t-1$, suggesting that prior to engaging in non-GAAP earnings management the firm has likely exhausted its AM choices and is using its RTM options. In addition, in the second year of engaging in non-GAAP earnings management, the percentage of overvalued non-GAAP firms increases to over 74 percent. Not surprisingly, the amount of *AM* increases in year *t*, indicating the large impact that *NonGAAP* has on the amount of accruals management. Taken together, this evidence suggests that the majority of misstatement firms were overvalued prior to engaging in non-GAAP earnings management, prompting managers to use non-GAAP earnings management to sustain their overvalued equity.

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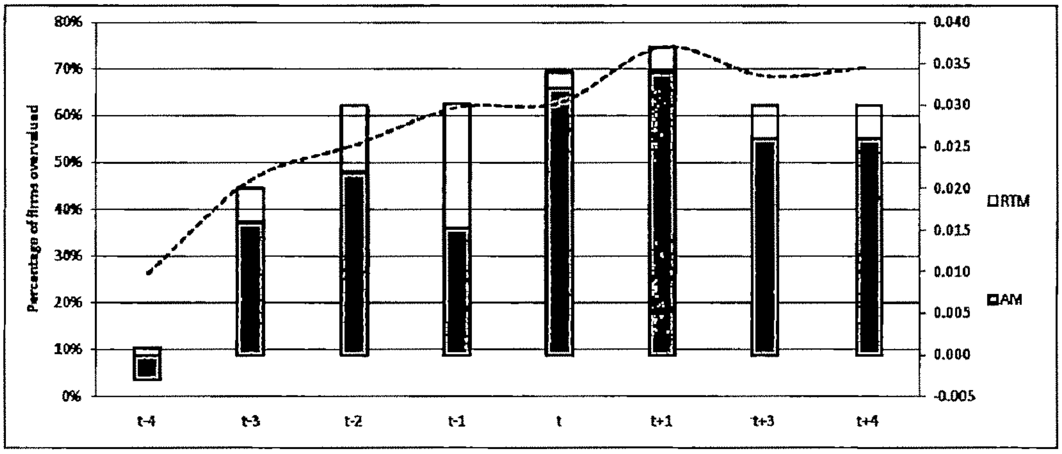
[11] It is unlikely that a firm's equity will remain overvalued following a restatement announcement. To address this issue, I examine the percentage of misstatement firms that are overvalued prior to their restatement announcement.

FIGURE 2
Overvaluation of Non-GAAP Earnings Management Firms and the Choice of Earnings Management Mechanisms



This figure provides the percentage of non-GAAP earnings management firms that are deemed to be overvalued prior to, during, and after the first year the firm engaged in non-GAAP earnings management. Year *t* is the first year the firm engages in non-GAAP earnings management and is also referred to as the first misstatement year. Once the restatement is announced, the firm is excluded from the analysis. The left-hand scale is for the percentage of firms that are overvalued each year, while the right-hand scale is for *AM* and *RTM*. See Appendix A for variable definitions.

In addition to the descriptive analysis in Figure 2, I also examine this issue within a multivariate probit analysis. Specifically, I examine whether the duration of a firm's overvaluation is associated with the firm's engagement in non-GAAP earnings management. In Table 4, the dependent variable equals 1 if the firm was deemed to engage in non-GAAP earnings management, and 0 otherwise. The coefficients on *OVER2* through *OVER5* > are positive and significantly different from 0, suggesting that firms that are overvalued for two or more years are more likely to engage in non-GAAP earnings management. In order to determine whether a firm is more likely to engage in NonGAAP the longer the firm is overvalued, I test for differences in the coefficients of *OVER*(*i*). Findings indicate that the coefficient on *OVER5* > is greater than that of *OVER4*, which is greater than *OVER3*, and so on. This suggests that the longer a firm is overvalued, the more likely the firm is to engage in NonGAAP. I also examine whether overvalued firms, irrespective of how long they have been overvalued, are more likely to engage in NonGAAP. Specifically, I replace *OVER*(*i*) with *OVER*, where *OVER* is equal to 1 if the firm is deemed to be overvalued in year *t*. *OVER* is positive and highly significant, indicating that overvalued firms are more likely to engage in NonGAAP than firms that are not overvalued. Such results corroborate my findings and provide further support that overvaluation is an important determinant of managements' earnings management decisions.

Endogeneity

The preceding analyses treat overvaluation and earnings management as well as the choice between AM, RTM, and NonGAAP as being exogenously determined. However, it is possible that the relation between overvaluation and earnings management and/or the relation between the different

TABLE 4

Probit Analysis for Non-GAAP Earnings Management

	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Intercept	−2.044	0.082	−2.796	0.075	−3.031	0.051
Overvalued Equity						
OVER1	0.709	0.164	0.936	0.131		
OVER2	2.123*	0.072	2.041	0.108		
OVER3	3.406**	0.022	3.183**	0.030		
OVER4	5.010**	0.001	4.266*	0.001		
OVER5 >	7.115***	0.001	6.899***	0.001		
OVER					3.157	0.015
Earnings Management-Specific Control Variable						
BTD	0.734	0.091	0.634	0.118	0.846	0.083
Corporate Governance Control Variables						
CEOBRD			0.903	0.051	1.011	0.064
SAL			0.000	0.703	0.000	0.822
BONUS			0.160	0.482	0.168	0.509
OWNER			0.082	0.036	0.029	0.029
UN_OPTIONS			0.098	0.106	0.091	0.133
General Control Variables						
RTM	0.009	0.249	0.012	0.168	0.016	0.202
AM	0.022	0.142	0.024	0.171	0.020	0.218
BLOAT	0.083	0.001	0.078	0.004	0.087	0.001
BIGAUD	−1.642	0.044	−1.086	0.119	−0.825	0.141
MBE	0.140	0.067	0.158	0.059	0.137	0.064
ROE	0.006	0.594	0.008	0.685	0.001	0.791
LEV	−0.320	0.204	−0.219	0.183	−0.257	0.177
IC	0.206	0.198	0.196	0.203	0.229	0.232
TA	−0.030	0.166	−0.040	0.152	−0.046	0.147
SOX	−0.022	0.059	−0.020	0.066	−0.018	0.062
ΔGDP	−0.002	0.398	−0.003	0.346	−0.001	0.478
Firm Fixed Effects	Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes	
Model Summary Statistics						
Pseudo R^2	0.168		0.193		0.177	
Obs.	33,502		19,775		19,775	

*, **, *** Signify that the coefficient on *OVER*(*i*) is significantly greater than the coefficient on *OVER*(*i* − 1) at the 10 percent, 5 percent, and 1 percent levels, respectively (one-tailed). For example *OVER2* (2.123) is significantly greater than *OVER1* (0.709).

One-tailed p-values are based on t-statistics that have been adjusted to control for the clustering by year and multiple firm observations. See Appendix A for variable definitions.

types of earnings management is endogenous. Endogenously determined variables can cause the parameter estimates to be biased and inconsistent, which could cloud the interpretation of results.

The standard econometric solution for endogeneity is to use a two-stage least squares (2SLS) procedure that relies upon instrumental variables to generate predicted values of the independent variables (Greene 2000; Larcker and Rusticus 2010). For the instrumental variable (IV) approach to be viable, the instruments used to predict the explanatory variables must be highly correlated with the explanatory variables deemed to be endogenous, but must also be uncorrelated with the disturbance term from the structural models used to explain each earnings management choice. Unfortunately, instrumental variables that satisfy these conditions are difficult to identify in most accounting research settings (Chenhall and Moers 2007; Larcker and Rusticus 2010). This is particularly true with respect to overvaluation and earnings management in that there is no well-developed theory of the economic determinants of overvaluation or for the different earnings management choices. Moreover, there are costs and benefits of controlling for endogeneity. Specifically, weak instruments make it likely that the IV method produces more biased inferences than simple OLS estimates (Larcker and Rusticus 2010).

Despite the potential concerns regarding identifying the proper instruments, it is still important to control for endogeneity in order to determine whether the inferences are consistent across both OLS and 2SLS. To address the various sources of potential endogeneity outlined above, I apply an IV approach in which I select a set of variables (i.e., instruments) for each endogenous variable that is assumed to be exogenous and estimate a system of simultaneous equations using 2SLS. Specifically, I estimate the following set of equations simultaneously using 2SLS:

$$Overvaluation_{i,t} = f(AM,\ RTM,\ NonGAAP,\ instruments\,for\ overvaluation,\ controls); \tag{7}$$

$$AM_{i,t} = f(Overvaluation,\ RTM,\ NonGAAP,\ instruments\,for\,AM,\ controls); \tag{8a}$$

$$RTM_{i,t} = f(Overvaluation,\ AM,\ NonGAAP,\ instruments\,for\,RTM,\ controls); \tag{8b}$$

$$NonGAAP_{i,t} = f(Overvaluation,\ AM,\ RTM,\ instruments\,for\,NonGAAP,\ controls); \tag{8c}$$

where each equation includes the dependent variables from the three other questions, a set of instruments for the variable being modeled, and a common set of control variables.

In order to identify instruments for overvaluation, I rely upon the accounting and finance literature (Travlos 1987; Moeller et al. 2004; Anderson et al. 2005; Jensen 2005) that links earnings growth (*EPS_GR*), acquisitions (*ACQ*), and analyst dispersion (*ANALYST_DISP*) to overvaluation. The common set of control variables that appear jointly in all equations includes both the corporate governance control variables and the general control variables. For the AM, RTM, and NonGAAP equations, the instruments are the same as the earnings management-specific control variables discussed earlier and used in Tables 3 and 4. For brevity they are not discussed again here. Note that *RTM* and *AM* are still included in the Equations (7), (8a), (8b), and (8c), when appropriate, but they are no longer grouped with the general control variables as they were in Tables 3 and 4 because the general control variables for 2SLS must be common among *all* equations. Finally, because I am interested in examining the duration of overvaluation and its impact on the choice of alternative earnings management mechanisms, I replace *Overvaluation* with *OVER*.

In the first stage of 2SLS (untabulated), I separately regress each endogenous variable on all exogenous (i.e., instrument) variables. The first stage yields a fitted value for each endogenous variable. In the second stage (Table 5), I separately estimate the equations by replacing the right-hand endogenous variable with its fitted value. In this stage, Equations (7) and (8c) are again estimated by performing a probit analysis. Because the estimates of the first-stage regression rely on the use of instruments, I correct the standard errors in the second-stage regression following Maddala (1983).

Table 5 presents the second-stage 2SLS results when *OVER* is the proxy for overvaluation.[12] The results indicate that overvaluation continues to be an important determinant of management's

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[12] Untabulated results also indicate that the results from the second-stage of the 2SLS are similar to those presented when *OVER1* – *OVER5* is the dependent variable in the 2SLS regression. Specifically, for the AM regression, the largest and most significant coefficients are on *OVER2* and *OVER3*, suggesting that AM occurs early in the duration of overvaluation. Moreover, for the RTM regression, the largest and most significant coefficients are on *OVER4* and *OVER5*, suggesting that RTM occurs later in the duration of overvaluation. Finally, the untabulated results suggest that NonGAAP is more likely to be utilized after the firm has been overvalued for three years or more.

TABLE 5

Second Stage of Two-Stage Least Squares with *OVER* as the Proxy for Overvaluation

	Endogenous Equation (AM)		**Endogenous Equation (RTM)**		**Endogenous Equation (NonGAAP)**	
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Intercept	−0.024	0.049	0.001	0.461	−2.610	0.043
Overvalued Equity						
OVER	0.019	0.055	0.033	0.068	2.949	0.051
Earnings Management Mechanisms						
RTM	−0.186	0.071			0.019	0.182
AM			−0.460	0.067	0.029	0.147
NonGAAP	0.024	0.085	−0.001	0.906		
Instruments for the Dependent Variable						
AF	−0.010	0.522				
LITIGATION	−0.054	0.093				
SEO	0.048	0.001				
HERF_INDX			−0.064	0.139		
MRK_SHR			−0.029	0.205		
DISTRESS			0.029	0.020		
BTD					0.728	0.079
Corporate Governance Control Variables						
CEOBRD	0.021	0.251	−0.011	0.648	1.134	0.023
SAL	0.063	0.158	−0.017	0.521	0.000	0.770
BONUS	0.069	0.019	0.077	0.091	0.120	0.495
OWNER	0.033	0.103	−0.066	0.097	0.049	0.043
UN_OPTIONS	0.243	0.011	−0.106	0.080	0.082	0.150
General Control Variables						
BLOAT	−0.026	0.021	0.029	0.041	0.089	0.001
BIGAUD	−0.016	0.083	0.003	0.846	−1.264	0.064
MBE	0.136	0.058	0.027	0.243	0.169	0.022
ROE	0.039	0.298	0.001	0.684	−0.003	0.892
LEV	0.022	0.333	−0.043	0.264	−0.199	0.202
IC	0.000	0.587	0.000	0.772	0.302	0.176
TA	0.009	0.099	−0.006	0.264	−0.006	0.489
SOX	−0.022	0.073	0.033	0.018	−0.088	0.099
ΔGDP	−0.010	0.385	0.010	0.336	0.013	0.548
Adjusted R^2	0.233		0.579		0.194	
Obs.	19,775		19,775		19,775	

One-tailed p-values are based on t-statistics that are corrected in the second-stage regression following Maddala (1983). See Appendix A for variable definitions.

choice of alternative earnings management mechanisms even after controlling for endogeneity. Specifically, the coefficient on *OVER* is positive and significant in the *AM*, *RTM*, and *NonGAAP* regressions. The substitution effect of RTM and AM also continues to hold. While not all of the instruments are significant, at least one instrument for each dependent variable is significant. The overall takeaway from Table 5 is that, although the significance of the coefficient on *OVER* is weaker for the 2SLS results, the inferences drawn from 2SLS are similar to those of OLS. Even though the inferences drawn from the both OLS and 2SLS are consistent, these findings should be interpreted with caution because the interpretation of the 2SLS results depends on successfully indentifying appropriate instruments and a well-specified model.

VI. CONCLUSION

This study tests and extends several conjectures put forward by Jensen's (2005) agency theory of overvalued equity. Specifically, I provide evidence of how the degree and duration of overvaluation affects managers' choice of alternative methods of managing earnings. Jensen (2005) predicts that overvaluation leads managers to engage in earnings management in an effort to sustain the firm's overvalued stock price. I provide evidence consistent with this reasoning. Specifically, I find that managers of overvalued firms not only exhibit greater evidence of exploitation of within-GAAP earnings management, but also as the duration of overvaluation continues, overvalued firms are more likely to engage non-GAAP earnings management, the most egregious form of earnings management. To my knowledge, this is the first study to provide evidence on how managers segue from one type of earnings management to another in order to sustain overvaluation.

Collectively, the results suggest that overvaluation is an important determinant of managements' earnings management decisions. Therefore, this study provides a more complete picture of the relation between overvaluation and alternative earnings management mechanisms. This study also complements the earnings management literature by providing insight into the choice of alternative mechanisms among firms with varying lengths of sustained overvaluation.

These findings have implications for regulators and provide avenues for future academic research. For regulators, increasing scrutiny of and further constraining accruals management may not prohibit managers from engaging in alternative forms of earnings management. On the contrary, such measures could serve only to shift the focus of the earnings management toward real transactions management or some other mechanism such as classification shifting (Fan et al. 2010). Regulators might consider examining regulations to decrease the frequency of overvaluation, including short-selling constraints. Researchers interested in determining how firms are likely to manage earnings should consider the impact that overvaluation plays in a management's choice of alternative earnings management mechanisms. Finally, future research could examine what causes firms to become overvalued, including the role of regulators, governance mechanisms, expectations management, and other constraints on earnings management mechanisms.

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APPENDIX A

Variable Definitions and Data Sources

ACQ = 1 if the firm engaged in an acquisition in the prior two years and the sales contribution of the acquisition (#249) exceeds 20 percent of total sales (#12), and 0 otherwise;

AF = number of analysts following the firm in year *t*–1 from I/B/E/S;

AM = amount of accruals management derived from the performance-matched modified Jones model (Kothari et al. 2005) for year *t*;

ANALYST_DISP = standard deviation of annual earnings forecasts from I/B/E/S scaled by year *t*–1 stock price;

B = book value per share (#60/#25) in year *t*–1;

BIGAUD = 1 if the firm is audited by a Big 4/5/6 auditor (#149 value of 1–7) in year *t*, and 0 otherwise;

BLOAT = amount of balance sheet bloat. Balance sheet bloat as net operating assets in year *t* divided by total sales (#12) at the end of year *t*–1. Net operating assets are equal to operating assets minus operating liabilities. Operating assets equal total assets (#6) minus cash and short-term investments (#1). Operating liabilities equal total assets (#6) minus short-term debt (#34) minus long-term debt (#9) minus minority interest (#38) minus preferred stock (#130) minus common equity (#60). *BLOAT* is equal to the firm-specific balance sheet bloat minus the industry median balance sheet bloat;

BONUS[a] = ratio of the CEO's bonus divided by the total compensation received by the CEO in year *t*;

BTD = firm's book-tax differences in year *t*, which equals book income less taxable income scaled by total assets in year *t*–1. Book income is pre-tax income (#170). Taxable income is calculated by grossing the sum of current federal tax expense (#63) and current foreign tax expense (#64) and subtracting the change in NOL carryforwards (#52). If current federal tax expense is missing, then total current tax expense is calculated by subtracting deferred taxes (#50), state income taxes (#173), and other income taxes (#211) from total income taxes (#16);

CEOBRD[a] = indicator variable that equals 1 if the CEO also holds the title of chairperson in year *t*, and 0 otherwise;

DISTRESS = 1 if a firm's Altman Z-score (Altman 1968) is less than 2.675 in year *t*–1, and 0 otherwise. The Z-score is calculated following a modified version of Altman's (1968) Z-score that proxies for a firm's financial condition. Specifically, Z-score = 3.3(Net Income/Assets) + 1.0(Sales/Assets) + 1.4(Retained Earnings/Assets) – 1.2(Working Capital/Assets) + 0.6(Stock Price × Shares Outstanding)/Total Liabilities. See Altman (1968) for complete details;

EM = sum of AM and RTM. The larger the amount of EM the more likely the firm is engaging in earnings management;

EPS_GR = I/B/E/S long-term EPS growth estimate for year *t*–1;

HERF_INDX = sum of the squared share of each company's sales (#12) to total sales in the same three-digit industry in year *t*–1. *HERF_INDX* ranges from 0 (perfect competition) to 1 (pure monopoly);

IC = inverse of the firm's interest coverage ratio, calculated as interest expense (#15) in year *t*, divided by operating income before depreciation (#13) in year *t*–1;

LEV = leverage ratio, calculated as short-term debt (#34) plus long-term debt (#9) in year *t*, scaled by total assets (#6) in year *t*–1;

LITIGATION = 1 if the firm is in a high litigation risk industry including biotechnology, computers, electronics, and retail (Francis et al. 1994);

MBE = 1 if the firm *i* meets or beats the consensus annual I/B/E/S analyst earnings forecast in year *t*–1, and 0 otherwise;

MRK_SHR = percentage of a company's sales (#12) to total three-digit industry sales in year *t*–1;

MVE = market value of equity as of June 30 of year *t*;

NonGAAP = 1 if the firm restated due to an accounting irregularity in year *t*, and 0 otherwise. All restatements are the result of income-increasing earnings management. The non-GAAP earnings management sample comes from three different sources that identify restatement announcements from 1997 to September 2008 (GAO-03-138, GAO-06-678, Audit Analytics database). Specifically, if a firm engaged in non-GAAP earnings management in 1998, 1999, and 2000, then NonGAAP would equal 1 for those firm-years, and 0 for all other firm-years;

OVER = 1 if the firm is in the top quartile of P/V in year *t*, and 0 otherwise;

OVER(*i*) = 1 if the firm has been in the top quintile of P/V for (*i*) consecutive years, and 0 otherwise. For instance, *OVER2* is equal to 1 if the firm is overvalued for two consecutive years, and all other *OVER*(*i*)s are 0. For every firm-year, only one *OVER*(*i*) indicator variable can be equal to 1;

OWNER[a] = sum of restricted stock grants in the current period and the aggregate number of shares held by the executive at year-end *t*–1 (excluding stock options) scaled by total outstanding shares of the firm;

P = stock price from CRSP as of June 30 in year *t*;

RET12 = average one-year buy-and-hold return for the portfolio that is formed every year at the end of June;

RET36 = average three-year buy-and-hold return for the portfolio that is formed every year at the end of June. Since *RET36* requires three years of data following the formation of the portfolio, I am unable to calculate *RET36* for years greater than or equal to 2006;

ROE = return on equity for year *t*–1 computed as net income (#237) for year *t*–1 divided by the year *t*–1 average book equity (#60);

RTM = amount of real transactions management, which is the sum of *AbnDISEXP*, *AbnCFO*, and *AbnPROD* for year *t*. The larger the amount of RTM, the more likely the firm is engaging in real transactions management;

SAL[a] = amount of CEO's base salary in year *t*–1;

SEO = 1 if the firm engaged in a seasoned equity offering in year *t*. I obtain my SEO sample from the Securities Data Company (SDC) New Issue database, which consists of 1,864 completed U.S. offers over the 1994 to 2008 period after I exclude SEOs with missing Compustat data for one year prior to the SEO filing date, the filing year, and the subsequent year;

SOX = 1 for fiscal years 2002 onward, and 0 otherwise;

TA = natural log of total assets (#6) in year *t*–1;

UN_OPTIONS[a] = number of unexercised options (including options grants in the current period) that the executive held at year-end *t*–1 scaled by total outstanding shares of the firm;

V = fundamental value measure derived using the current I/B/E/S consensus analyst predictions of future earnings available prior to June 30 of year *t*; and

ΔGDP = percent change in the real gross domestic product from year *t*.

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[a] Indicates the source of the data is ExecuComp.

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Informed Trading and the Market Reaction to Accounting Restatements

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ABSTRACT: We examine how informed trading activities affect the market reaction to accounting restatements. We find significantly less negative reactions to accounting restatements when managers are net purchasers of stock before the restatement, and significantly more negative market reactions when managers are net sellers. Similar patterns characterize corporate trading, where prior stock repurchases dampen negative reactions and prior equity issuances increase negative reactions to the restatement. We address the possibility of reverse causality in which informed trades are undertaken because of the expected market reaction by examining the difference between disclosed and non-disclosed trades, finding that the market reaction is concentrated in the disclosed trades. Our results are incremental to general return patterns associated with insider trading and corporate equity transactions, and hold after controlling for other determinants of the market reaction to restatements. Taken together, these findings suggest that investors use informed trading activities to help interpret and price accounting restatements.

Keywords: *information risk; restatements; insider trading; repurchases.*

JEL Classifications: *M41; M42.*

Data Availability: *Data are publicly available from the sources identified in the study.*

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I. INTRODUCTION

There is considerable research on the stock market reaction to accounting restatements. Several studies document large negative market reactions, with an average loss in equity value of 10 percent (Palmrose et al. 2004; Hribar and Jenkins 2004). Part of this reaction is due to revisions in expected future cash flows, and part is due to increases in information risk because of heightened uncertainty about management credibility and the financial statements (Palmrose et al. 2004; Hribar and Jenkins 2004; Francis et al. 2005; Kravet and Shevlin 2010). The accounting literature has examined a variety of restatement features and firm characteristics that explain the magnitude of the stock price reaction. We extend this literature by investigating the effect of prior informed trading on the market's reaction to the restatement announcement. We predict and find evidence that when a firm restates its financial statements, the market uses the magnitude and direction of prior insider and corporate trades to help price the implications of the restatement.

We examine two types of informed trading: (1) individual trading by insiders and (2) corporate trading via share issuances and repurchases. Research in corporate finance suggests that observable equity transactions undertaken by individuals with superior information are an important source of information transfer that allows investors to better price corporate events where there is significant information asymmetry (Jensen and Meckling 1976; Leland and Pyle 1977; Miller and Rock 1985). To date, the accounting literature has not considered the role of informed trading when the quality of a firm's financial reporting is questioned.

We apply the corporate finance literature on informed trading to the case of accounting restatements. Specifically, we examine whether the market considers informed trading when pricing the implications of an accounting restatement. Our focus is on the market reaction on the date of the restatement, so we focus on informed trading that occurs prior to the restatement announcement. We hypothesize and find evidence that prior informed trading has an interactive effect on the market reaction to accounting restatements. We show that the market reaction is affected by the prior trading activity of managers, whereby insider buying and share repurchases result in a less negative market reaction, and insider selling and equity issuance result in a more negative market reaction. Using a matched sample of non-restatement firms, we show further that this reaction is incremental to previously documented return patterns that follow insider trading and net equity issuances (e.g., Pontiff and Woodgate 2008).

Our goal is to demonstrate that prior informed trading serves as a credible signal on the restatement announcement date that affects how investors price the restatement. To do so, however, we need to account for the fact that the manager might know of the impending restatement and make trades based on the expected market response. This behavior could generate an association between restatement period returns and prior informed trading, although the direction of the causality would be reversed.

Therefore, a critical feature of our design is investigating the possibility that reverse causality is responsible for the significant association between returns on the restatement date and prior informed trading. To address this issue, we use an approach similar to Huddart et al. (2007), and partition our sample into informed trading that has been disclosed by the restatement date and trades that have been made but not yet disclosed. For example, we take advantage of the previous insider trading reporting rules, whereby trades did not have to be disclosed until the tenth day of the month following the month of the trade. Using this window, we can identify trades that occurred prior to the restatement, but were not filed with the SEC until afterward. If the observed association between restatement date returns and prior informed trading is due to insiders trading in expectation of the market reaction, then we should not observe a difference between disclosed trades and the non-disclosed trades and their association with restatement period returns. If, however, the market is using the information in the trades to help price the accounting restatement, then we only expect to see an association with the disclosed trades, as the non-disclosed trades are not known by the market on the restatement date.

We control for other determinants of the market reaction to the restatement that might also be related to informed trading. For example, we control for the prompter of the restatement, the severity of the restatement, and firm characteristics such as cash flow from operations, size, and prior returns. We also control for future events that shed light on the severity of the restatement. For example, prior research has shown an association between restatements and subsequent litigation and CEO turnover (Palmrose and Scholz 2004; Desai et al. 2006). Johnson et al. (2007) argue that insider trading provides an indication of fraudulent intent, leading to more litigation when there are insiders selling and accounting restatements. In addition, Karpoff et al. (2008) show that the likelihood of executive turnover increases when insider-trading activities are included in the SEC enforcement action related to restatements. Accordingly, we include measures of future CEO turnover, future litigation, SEC enforcement actions, and whether the restatement is due to fraud to control for the effect of these events on the market reaction to the restatement. Because these tests require perfect foresight on the part of the market and might be part of what the market is trying to learn from the informed trading signals, we run the analysis with and without these controls.

We find that short-window stock returns at the time of a restatement are related to the direction (e.g., net buying versus selling) and magnitude (e.g., number of shares bought or sold) of prior informed trading. Using a five-day return window around the restatement (−2 to +2), we find that the average market reaction to a restatement is significantly less negative when there are net stock repurchases or insider purchases, and significantly more negative when there are net equity issuances or insider selling. We also find that the magnitude of the prior informed trading is significantly associated with the market reaction, where larger net issuances or insider sales generate significantly more negative returns, and larger repurchases or insider buys generate significantly less negative returns. Importantly, when we decompose these trades into disclosed and non-disclosed trades, we find that the association is concentrated in the disclosed trades and that there is no association with the non-disclosed trades, suggesting that the market is using the available informed signals on the date of the restatement to help price this event.

We next examine the return window from +3 to +60 days after the restatement to determine whether the results persist in the post-restatement period. Because of the longer return window and the known drift associated with equity issuances and repurchases, we use a matched sample to control for the general tendency of stock returns to be positive following net repurchases and negative following net issuances (Pontiff and Woodgate 2008). We continue to find evidence that the direction of past informed trading affects returns, but the magnitude of the trading is only significant with respect to the negative signals—insider selling and equity issuances.

Our study provides new evidence on the information that investors use to interpret and price accounting restatements. We are interested in the role of informed trading, in part, because of recent research linking accounting restatements to heightened information uncertainty (Francis et al. 2005; Lambert et al. 2007; Kravet and Shevlin 2010). We show that informed trading is an important signal when investors are concerned with the quality of financial reporting, and that investors incorporate this information when reacting to a restatement. Although not the primary focus of our study, we also provide new evidence that prior insider selling and equity issuances substantially increase the incidence of CEO turnover and the frequency of class-action lawsuits following a restatement.

Section II provides background, describes the corporate finance and accounting literature, and develops hypotheses about restatements and informed trading. Section III describes the sample selection procedures and provides descriptive information about restatement events, repurchase activity, and insider trading. Section IV presents our results and Section V concludes.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Informed Trading and Corporate Events

Research in corporate finance has examined mechanisms for separating firms during periods of high uncertainty. This research is particularly relevant when information asymmetry is high and insiders have private information about current or long-term prospects of the firm. In this setting, the magnitude and direction of informed trading, either personal or corporate, provides signals about managers' expectations of future firm performance (Myers and Majluf 1984; Gu and Li 2007). In equilibrium, the market attends to these signals, reducing the costs associated with information asymmetry.

With respect to insider trading, John and Mishra (1990) find that insider trades act jointly with corporate announcements, such as announced capital expenditures, to efficiently convey information to the market. Similarly, John and Lang (1991) find that insider trading in the immediate pre-announcement period of a dividend policy change plays an important role in explaining announcement period returns. Johnson et al. (1996) find that the magnitude and direction of prior insider trading affects the market reaction to seasoned equity offerings (SEOs). More recently, Gu and Li (2007) find that voluntary disclosures of innovative strategies by high-tech firms are associated with more positive stock price reactions when the announcement is preceded by insider purchases. Thus, there is considerable evidence that investors use insider buying and selling to help interpret other corporate events, particularly when these events are characterized by high amounts of uncertainty.

Research on corporate stock transactions such as equity issuances and repurchases suggests that these transactions provide similar signals to the market (John and Lang 1991; Lie 2005; Louis and White 2007; Pontiff and Woodgate 2008). Rather than committing personal capital, managers can commit the firm's capital to repurchase their shares if they believe the stock is undervalued (e.g., Ikenberry et al. 1995). Alternatively, they can issue equity if they believe the firm is overvalued (e.g., Loughran and Ritter 1995). The fact that repurchases predict good future performance and issuances predict poor future performance suggests that managers use private information to time capital transactions to take advantage of relatively high or low valuations. Consistent with this notion, Pontiff and Woodgate (2008) combine repurchases and issuances into a *net* equity issuance measure and show that it is predictive of future returns. They interpret their results as consistent with an opportunistic view of capital structure, whereby managers decide to repurchase or issue shares to take advantage of private information about future prospects. In summary, this research suggests that informed trading is an important source of information transfer that allows investors to better price corporate events where there is significant information asymmetry (Jensen and Meckling 1976; Leland and Pyle 1977; Miller and Rock 1985).

Accounting Restatements and Informed Trading

Prior research documents very large price reactions to accounting restatements, averaging a loss in market value of approximately 10 percent for all restatements, and greater than 20 percent for restatements deemed as irregularities (Palmrose et al. 2004). Prior research has found that this reaction reflects by both a "numerator effect," which is a decrease in expected future cash flows, and a "denominator effect," which is an increase in the firm's cost of capital (Palmrose et al. 2004; Hribar and Jenkins 2004; Kravet and Shevlin 2010). Evidence of the numerator effect is documented in Palmrose et al. (2004), who find an 8.5 percent decrease in earnings forecasts 45 days after a restatement, and Hribar and Jenkins (2004), who find a 14.7 percent decrease in one-year-ahead earnings forecasts and a 7.8 percent decrease in two-year-ahead earnings forecasts. Evidence on the denominator effects is documented in Hribar and Jenkins (2004), who estimate a

10 percent to 19 percent relative increase in the cost of capital using implied cost of capital models, and Kravet and Shevlin (2010), who show an 86 basis point increase in the cost of capital using a discretionary information risk factor in a Fama and French (1993) factor model.

The very nature of restatements, particularly irregularities, therefore causes investors to revise their expectations of future earnings and cash flows downward, while simultaneously demanding a higher cost of capital. The reduction in expected future cash flows likely occurs because the restatement reduces the previously reported level of earnings and the implied earnings growth rate derived from the misstated earnings. When revising their forecasts, analysts or investors are likely to revisit their forecasting assumptions, particularly those related to the restated accounts, because of their revised belief about the economic prospects of the firm. Thus, restatements that affect key operating accounts, as opposed to non-operating accounts, tend to be associated with larger downward revisions (e.g., Palmrose et al. 2004). Other numerator effects might include expected future litigation costs or regulatory expenses incurred by the firm and reputational costs that affect the firm's relations with suppliers or customers, although these are more likely to be of a smaller magnitude.

When market participants revise their forecasts following a restatement, they will consider all information, including informed trading, to update expectations. Informed buying (selling) is a signal of increased (decreased) managerial expectations of future performance. The joint effect of the restatement and the informed buying (selling) activity is likely to result in a less (more) negative mean adjustment in expected cash flows and growth rates than if the informed trading had not occurred. Thus, although informed trading does not necessarily map into specific components of corporate cash flows, it is likely to affect the magnitude of the downward revisions in expected cash flows that accompany a restatement.

The denominator effect, which is an increase in the cost of capital, has been attributed to the increased information risk facing investors after a restatement. Restatements increase uncertainty by rendering future financial reports less reliable (Wilson 2008) and by causing investors to question the credibility of management (Palmrose et al. 2004; Hribar and Jenkins 2004). This potentially affects investors' perception of the information risk, which has been linked to the cost of capital in recent asset-pricing models (Easley and O'Hara 2004; Lambert et al. 2007) and specifically linked to restatements (Hribar and Jenkins 2004; Francis et al. 2005; Kravet and Shevlin 2010). Here again, prior informed trading is likely to affect the uncertainty in the market, and therefore the magnitude of the denominator effect. For example, prior selling suggests more nefarious behavior on the part of management, and is likely to increase the information risk premium at the time of the restatement, while prior buying might help mitigate the uncertainty facing investors, leading to a smaller increase in information risk and the cost of capital.

Although we examine both corporate transactions and personal transactions, we also recognize that they could have different implications for investors pricing an accounting restatement. In particular, there is a fundamental difference in the agency problems associated with these different types of informed trading activities. In the case of insider selling prior to a restatement, managers are extracting personal benefits at the expense of the other shareholders. In contrast, in the case of equity issuance prior to the restatement, the proceeds from the issued shares become assets of the company.[1] To the extent that equity is issued at a price that exceeds the intrinsic value of the company, the entire set of existing shareholders benefit from an equity issuance at the expense of the new shareholders. Thus, the manager extracts personal benefits only to the extent that s/he holds equity in the company, but his/her benefits are no different from those of any other current shareholders. Therefore, because insider selling personally benefits the manager and signifies a more serious agency problem than do equity issuances, it is reasonable to expect greater reputational penalties for managers who engage in insider selling prior to a restatement than for managers who issued equity prior to a restatement. To the extent that managers hold large equity positions, however, there might still be questions raised about the integrity of issuing shares prior to a restatement.

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[1] In the case of stock-based acquisitions, the assets of the acquired entity become assets of the acquirer. Our measure of equity issuances captures both equity issued for cash and equity issued in a stock-based acquisition.

Similar logic can be applied when comparing insider buying to share repurchases. In the case of insider buying, the manager personally commits capital to the acquisition of shares. Because this activity has a more direct effect on the manager's personal wealth, it could be viewed as a more credible signal that the firm is viable, such that the restatement could be viewed as being less serious or egregious than would otherwise be the case. In contrast, share repurchases use the firm's capital rather than the manager's personal capital, likely constituting a weaker signal of the underlying viability of the firm or the seriousness of the restatement. However, because stock prices drop precipitously following a restatement, in both cases we believe it is less likely that a manager would either repurchase or invest personal capital with knowledge of the impending restatement or the underlying accounting irregularities. Thus, both types of informed buying likely signal that accounting irregularities are less widespread and ubiquitous than would otherwise be perceived, particularly when compared to cases with prior selling or issuances.

Although these differences in corporate and personal trading suggest differences in the interpretation of these signals by investors, we do not formally hypothesize differences in the magnitude of the reactions based on the type of informed trading. We believe it is difficult to objectively rank, *ex ante*, the effects of the different types of informed trading on the market reaction. We also do not attempt to disentangle the market's reaction into the numerator (changes in the cost of capital) and denominator (changes in expected future cash flows) effects, in part because of the empirical difficulties associated with doing so, and in part because we expect that informed trading activities will affect both expected future cash flows and information risk.[2]

Therefore, we develop directional hypotheses about how stock prices respond to past insider trading and corporate equity transactions at the date of an accounting restatement, without hypothesizing the rank order of the magnitude of the effects. We expect that informed buying will mitigate the risk and cash flow uncertainty evoked by the restatement by providing credible signals about the underlying viability of the firm. In contrast, we predict that informed selling will increase the uncertainty regarding the restatement. We expect that investors consider these signals when reacting to the restatement announcement, such that we should see price reactions to the restatement that are a function of past informed trading activities. This reasoning leads to the following hypotheses stated in the alternate form:

H1a: Insider buying (selling) prior to a restatement announcement will lead to less (more) negative abnormal returns in response to an accounting restatement.

H1b: Stock repurchases (issuances) prior to a restatement announcement will lead to less (more) negative abnormal returns in response to an accounting restatement.

The goal of H1a and H1b is to demonstrate that prior informed trading affects the market reaction to the restatement (Palmrose et al. 2004; Hribar and Jenkins 2004; Francis et al. 2005; Kravet and Shevlin 2010). Empirically, however, an association between informed trading and stock returns around the restatement date might be caused by managers knowing about the impending restatement and making advance trades based on the expected market response. This would generate a similar association, but the direction of the causality would be reversed.

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[2] The empirical estimation of a short-window change in the discount rate can be accomplished using implied cost of capital models (Botosan 1997; Gebhardt et al. 2001; Gode and Mohanram 2002; Botosan and Plumlee 2002; Easton and Monahan 2005). This requires a short-window change in the proxy for expected cash flows, such as analyst forecasts. Because of the limited sample available to us, we have significantly fewer useable observations with analyst following and changes in the forecast within the narrow window around the restatement.

Therefore, we test a second set of hypotheses to address the possible reverse causality. We adopt an approach similar to Huddart et al. (2007) and partition our informed trades into those that have been disclosed by the restatement date, and those that have been made but not yet disclosed.[3] If managers trade based on the expected response to the restatement, then we should observe a significant association between the non-disclosed trades and the market reaction on the restatement date. If the market is responding to the signal of past insider trades, then there should be no response to trades that have yet to be disclosed. This reasoning leads to the following hypotheses:

H2a: Insider buying (selling) that has been disclosed by the date of the restatement announcement will lead to less (more) negative abnormal returns than insider buying (selling) that has not yet been disclosed.

H2b: Stock repurchases (issuances) that have been disclosed by the date of the restatement announcement will lead to less (more) negative abnormal returns than stock repurchases (issuances) that have not yet been disclosed.

In testing our hypotheses, it is important to recognize that there are other factors affecting the market's reaction to restatements that are likely to be correlated with informed trading. Therefore, we include several variables in our analysis that are likely to affect the market's reaction to restatements. For example, insider selling or equity issuances in the periods before the restatement is announced are more likely to indicate the manager's awareness of, and possible involvement in, the financial statement irregularity. We therefore include control variables for whether a CEO or CFO was fired, whether there was a class-action lawsuit filed against the firm, the dollar magnitude of the misstatement, whether the restatement affects core operating earnings, and whether the restatement involved fraud. Because many of these factors are not knowable with certainty on the restatement date, we examine the model both with and without these forward-looking variables. Finally, we include a variety of control variables that reflect properties of the restatement and variables that capture differences in firm characteristics. We include controls for the number of years the firm restates and whether the prompter of the restatement is the company, the auditor, or the SEC. We also include total assets, book-to-market ratio, earnings-to-price ratio, cash from operations, total accruals, leverage, and interest coverage as additional controls.

Our research is related to, but distinct from, other studies that have examined informed trading around restatements. Beneish (1999) documents abnormal insider trading at inflated prices during periods when earnings are overstated. He finds that neither reputation costs nor regulatory penalties are large enough to discourage strategic insider trading behavior. Similarly, Ravina and Sapienza (2010) find that insiders earn 4.06 percent more than the market in the 80-day window surrounding restatement announcements. Li and Zhang (2006) and Agrawal and Cooper (2008) examine the strategic trading of managers around accounting restatements. Li and Zhang (2006) find that insiders appear to trade on private information two to eight quarters prior and one, two, and four quarters following a restatement announcement. The authors find that insiders suspend all trading in the quarter immediately before and concurrent with the restatement announcement; nevertheless, insiders are able to extract a considerable profit by engaging in informed trading around restatement announcements. Agrawal and Cooper (2008) document that, when insiders sell prior to the restatement and then purchase immediately following it, they realize considerable profits. Moreover, these authors find that the passage of the Sarbanes-Oxley Act of 2002 (SOX) constrains this opportunistic behavior around the restatement announcement. Using a broader sample of firms, Brochet (2010) shows further that SOX reduces managers' incentives to sell shares ahead of privately known bad news. His finding suggests that changes in the timeliness of disclosure help constrain managers' ability to benefit from privately known bad news. The common theme among these studies, however, is that they are interested in studying the trading behavior of managers.

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[3] We thank an anonymous reviewer for this suggestion.

Our research interests differ from these studies in that we are not interested in studying the reasons for insider trading and stock repurchases. We are agnostic with respect to the cause of informed trading activities. Instead, we are interested in examining how the market uses the observable prior actions of managers (i.e., informed trading) in determining the price response to the restatement.

III. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Sample Selection

We obtain our sample from three different sources that identify restatement announcements from 1997 to September 2008 (GAO-03-138, GAO-06-678, and the Audit Analytics database). Because we are interested in examining the role of informed trading on restatements that raise questions about the quality of financial reporting and not on restatements that reflect unimportant accounting errors, we limit our sample to the most egregious restatements. Specifically, we only use those observations for which the restatement is described as an accounting irregularity (as opposed to an accounting error). Our initial sample contains all accounting restatements from the General Accounting Office (GAO 2002, 2006) database that are classified by Hennes et al. (2008; hereafter, HLM) as accounting irregularities. The GAO (2002, 2006) database contains accounting restatements announced between January 1999 and September 2005. We extend this sample by including additional accounting irregularities identified by Audit Analytics from October 2005 to December 2008.[4] Our final sample is a comprehensive sample of accounting irregularities spanning 11 years.

HLM show that restatements resulting from irregularities elicit a larger decrease in stock price relative to those deemed as accounting errors. Moreover, Burks (2011) shows that a significant portion of recent restatements are not likely to question the quality of a firm's financial reporting because they are due to errors in the application of GAAP (e.g., lease restatements) and result in substantially smaller stock market reactions. By focusing exclusively on restatements that raise red flags about financial reporting quality, we are able to maximize the statistical power of our analysis that examines the role of informed trading.

Table 1, Panel A details the firms excluded due to various sample selection criteria to arrive at our final sample. We start with all accounting irregularities between 1997 and 2008. We eliminate 189 restatements because they are missing basic Compustat data in year *t* or *t*–1, or CRSP data in year *t*, where *t* is the year of the restatement. We eliminate another 32 restatements because of missing insider trading data. We eliminate another six restatements because the database records more than one announcement for the same restatement. Finally, the unique firm identifier in the database is the ticker symbol, but because these are recycled in practice, we check all company names after merging the database with CRSP and Compustat. We eliminate three observations where the difference between databases could not be reconciled to arrive at our sample of 541 unique restatement firms.

The restatement database partitions the sample by the reason for the restatement—i.e., the type of account or transaction giving rise to the restatement. Table 1, Panel B classifies the restatements according to the type of account or transaction. Restatements are classified into nine categories:

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[4] Audit Analytics and HLM have similar criteria for identifying accounting irregularities. The correlation between the sample years that overlap is approximately 94 percent.

TABLE 1

Description of Sample Size and Sample Composition

Panel A: Description of Final Sample for Restatement Firms

Restatements Described as an Accounting Irregularity from January 1997 to December 2008	771
1. Missing basic Compustat and CRSP data in the year of or the year prior to the restatement	(189)
2. Missing insider trading data in the year of or the year prior to the restatement	(32)
3. Exclusion of subsequent restatement announcements related to the same company	(6)
4. Exclusion of firms where GAO and CRSP company names differ	(3)
Restatement Sample	541

Panel B: Distribution of Restatements by Account or Transaction

Reason for the Restatement	GAO and Audit Analytics	%	Restatement Sample	%
Revenue	1,133	32.53%	330	53.92%
Expense	924	26.53%	178	29.08%
Mergers and Acquisitions	144	4.13%	58	9.48%
In-Process R&D	61	1.75%	0	0.00%
Reclassification	233	6.69%	3	0.49%
Related Third Party	69	1.99%	6	0.98%
Restructuring	321	9.22%	7	1.14%
Securities	303	8.70%	8	1.31%
Other	294	8.45%	22	3.59%
Restatement Reasons	3,482		612	
Restatement Sample	2,844		541	

revenue recognition; cost or expense; mergers and acquisitions; in-process R&D; reclassification; related-party transactions; restructuring; securities-related; and other. Our sample of 541 firms contains 612 reasons for restatements because some firms have multiple reasons for restating.

Although companies restate their financials for a variety of reasons, revenue recognition is the most common reason, representing 53.9 percent of the restatements. Restatements due to revenue recognition generally include instances of recognizing revenue either sooner or later than would have been allowed under GAAP, or recognizing questionable or fictitious revenue. Cost- or expense-related issues constitute the next most frequently identified reason, accounting for 29.1 percent of all restatements. These restatements include instances of improperly recognizing expenses, improperly capitalizing expenditures, or mistakes that led to misreported expenses.

We use Compustat and hand-collect information for all financial statement data, CRSP to measure prices, returns, and shares outstanding, and Thomson Financial for insider trading data. Our primary tests require measures of insider trading and stock repurchases and issuances. We define insider transactions as purchases or sales by the CEO, CFO, chairman of the board, and or president. Following John and Lang (1991), we use a net measure of insider trading (*NIT*), calculated as follows:

$$NIT_{(t-d,t-2)} = [PURCHASED_{(t-d,t-2)} - SOLD_{(t-d,t-2)}]/[PURCHASED_{(t-d,t-2)} + SOLD_{(t-d,t-2)}],$$

where *PURCHASED* (*SOLD*) is the number of shares purchased (sold) by insiders. The subscript *t* is the restatement date and d is the number of misstatement days. The window over which *NIT* is calculated is referred to as the misstatement period window, as it captures the period in which the firm was deemed to be violating GAAP and for which it must provide restated financials.[5] Our measure of insider trades is based solely on transactions in the underlying shares. Thus, if an executive exercises options, but does not subsequently sell the shares, it will not be included in our measure. A positive *NIT* indicates net insider buying, while a negative number indicates net insider selling.[6]

Our measure of stock issuances and repurchases follows Pontiff and Woodgate (2008), who show that a net measure of equity issuance provides the strongest indicator of future performance. We compute net corporate trading (*NCT*) as follows:

$$NCT_{(t-d,t-2)} = \ln ADJ\_SHR_{t-d} - \ln ADJ\_SHR_{t-2}$$

where *ADJ_SHR* is the number of adjusted shares outstanding on the first day the firm was deemed to have engaged in non-GAAP accounting. A negative amount for *NCT* implies that the firm is issuing shares, while a positive number implies that the firm is repurchasing shares. The variable definitions in Appendix A provide detailed descriptions of how we compute these measures and all other variables used in our analysis.

IV. RESULTS

Informed Trading and Restatement Characteristics

Table 2 reports a correlation matrix that shows the extent to which informed trading activity is associated with other characteristics of restatements. We include a variety of restatement characteristics that are known determinants of the market reaction. We examine who prompted the restatement (*P_COMP*, *P_AUD*, and *P_SEC*), whether the restatement affects core earnings (*CORE*), the length of the misstatement period (*LENGTH*), and the magnitude of the restatement (*EM*). In addition, we consider several forward-looking variables that become evident at some point after the restatement announcement, although they might be predictable based on restatement characteristics. Specifically, we examine whether there was an SEC enforcement action brought against the firm (*SEC_ENFORCE*), whether the CEO/CFO was subsequently fired as a result of the restatement (*FIRE*), whether the restatement results in a class-action lawsuit (*CLASS-ACTION*), and whether the restatement was associated with fraud (*FRAUD*).[7]

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[5] The length of the misstatement period ranges from four years to three months with the median misstatement period being one year. As a sensitivity analysis, we reran our results after (1) deleting the top and bottom 5 percent of restatements based on the misstatement period (i.e., *LENGTH*) and (2) using arbitrary windows of 180 days and 365 days prior to the restatement announcement to capture the amount of informed trading in these periods. Untabulated results indicate that our results are not unchanged in these alternative specifications.

[6] We have replicated our results using the Beneish and Vargas (2002) estimation process for net insider trading and the tenor of our results is unchanged in terms of sign and significance.

[7] The misstatement period window and the dollar magnitude of the restatements are hand-collected from the original and restated financial statements, while CEO and CFO firings are identified from restatement firms' press releases and include only those that were announced starting the day after the restatement announcement to one year after the restatement announcement. We thank Hennes et al. (2008) for the CEO/CFO turnover data. Class-action lawsuits are taken from the Stanford Law School Class-Action Clearinghouse database. A class-action lawsuit does not necessarily mean that the firm is found guilty of fraudulent accounting. Rather, a class-action lawsuit simply indicates that a suit has been filed against the firm. The *FRAUD* variable comes from two data difference sources. First, for restatement announcements from 2002–2008 Audit Analytics has a variable called *RES_FRAUD* that is equal to 1 if the restatement noted "Financial fraud or misrepresentations." Second, for restatement announcements prior to 2002, this variable was hand-collected using Lexis-Nexis, http://www.sec.gov, and 10kwizard.com, using keyword search "fraud," "fraudulent" or "fictitious" on all restatement firms' press releases and in restated financial statements that describe the nature of the restatement.

TABLE 2

Correlations for the Restatement Sample

	REPUR	*ISSUE*	*BUYER*	*SELLER*	*P_COMP*	*P_AUD*	*P_SEC*	*CORE*	*LENGTH*	*EM*	*FRAUD*	*SEC_ENFORCE*	*FIRE*	*CLASS-ACTION*
REPUR	—	**−0.494**	**0.097**	**−0.167**	−0.056	−0.038	**−0.103**	**−0.068**	0.017	0.026	**−0.090**	−0.061	**−0.167**	**−0.144**
ISSUE		—	**−0.103**	**0.089**	0.021	**0.076**	0.047	**0.063**	0.053	**0.044**	**0.086**	**0.059**	**0.103**	**0.067**
BUYER			—	**−0.449**	0.053	**−0.092**	−0.003	−0.032	−0.062	0.006	**−0.077**	−0.034	**−0.136**	0.026
SELLER				—	−0.016	**0.088**	**0.091**	**0.069**	**0.144**	0.055	**0.103**	**0.149**	**0.186**	**0.176**
P_COMP					—	**−0.121**	**−0.288**	**0.167**	0.006	0.023	**0.081**	0.008	**0.136**	**0.094**
P_AUD						—	**−0.109**	**0.136**	0.044	0.014	**0.063**	0.024	**0.054**	0.053
P_SEC							—	**0.129**	**0.126**	0.033	**0.167**	**0.349**	**0.076**	**0.131**
CORE								—	**0.073**	**0.082**	0.027	**0.103**	**0.068**	**0.109**
LENGTH									—	**0.243**	−0.039	−0.043	**0.088**	−0.036
EM										—	0.040	0.009	−0.034	−0.022
FRAUD											—	**0.380**	**0.687**	**0.771**
SEC_ENFORCE												—	**0.201**	**0.508**
FIRE													—	**0.801**
CLASS-ACTION														—

Bold indicates significance at the 10 percent level or better. See Appendix A for variable definitions.

Repurchases and insider buying are positively correlated, as are issuances and insider selling. Also, repurchases (issuances) are negatively correlated with insider selling (buying).[8] These results indicate that the different informed trading signals tend to provide similar signals.

We also note that repurchase firms are negatively related to restatements initiated by the SEC, the restatement of core earnings, restatements that are fraudulent, CEO/CFO termination, and the filing of class-action lawsuits. Insider buying firms are negatively correlated with an auditor-prompted restatement, restatements that are fraudulent, and CEO/CFO turnover. There are several similarities between restatements that are preceded by repurchases and those preceded by insider buying. Both are negatively related to auditor-prompted restatements and are positively related to fraud and CEO/CFO termination.

Restatements that are preceded by equity issuances are associated with auditor-prompted restatements, restatements of core earnings, and restatements of larger magnitude. Prior equity issuance is also positively associated with fraud, SEC enforcement actions, termination of CEO/CFO, and subsequent class-action lawsuits. Restatements that are preceded by insider selling tend to be positively associated with auditor- and SEC-prompted restatements, restatements of core earnings, and longer misstatement periods. Insider selling is also positively correlated with fraud, SEC enforcement action, CEO/CFO turnover, and class-action lawsuits. On balance, restatements that are preceded by issuances and insider selling appear to be more egregious, in that they are positively related to the forward-looking variables that proxy for bad news events. On the other hand, restatements that are preceded by repurchasing or insider buying are often negatively related to these variables.

Informed Trading and the Market Reaction to Accounting Restatements

Figure 1 presents descriptive evidence on the price reaction to accounting restatements for the full sample and also by each informed trading group. We chart the cumulative abnormal returns (CARs) from 60 trading days prior to the restatement announcement to 180 trading days after the restatement announcement for the full sample and for each of the four different types of informed trading—*REPUR*, *ISSUE*, *BUYER*, and *SELLER*.[9] The full sample result indicates a significant loss of market value on the day of the restatement announcement.

Focusing on the four types of informed trading reveals some interesting preliminary results. Prior to the restatement announcement, all four types of net informed trading appear to have similar return patterns. However, in the short window around the restatement announcement, the *REPUR* and *BUYER* firms experience returns that are substantially less negative than those of the *ISSUE* and *SELLER* firms. Additionally, the stock prices of the *REPUR* and *BUYER* firms appear to fully recover in the weeks following the restatement announcement. On the other hand, the stock prices of the *ISSUE* and *SELLER* firms continue to experience a significant downward drift following the restatement. Most of the differences between the returns occur within 30 days of the restatement announcement. After approximately 40 to 50 trading days, the slopes of *REPUR* and ISSUE, as well as *BUYER* and *SELLER*, start to level off. Overall, the results in Figure 1 provide evidence of markedly different price reactions to restatements when there is prior informed trading.

Table 3 presents univariate results examining whether prior equity transactions and/or insider trading transactions affect the restatement announcement stock returns at the time of the restatement

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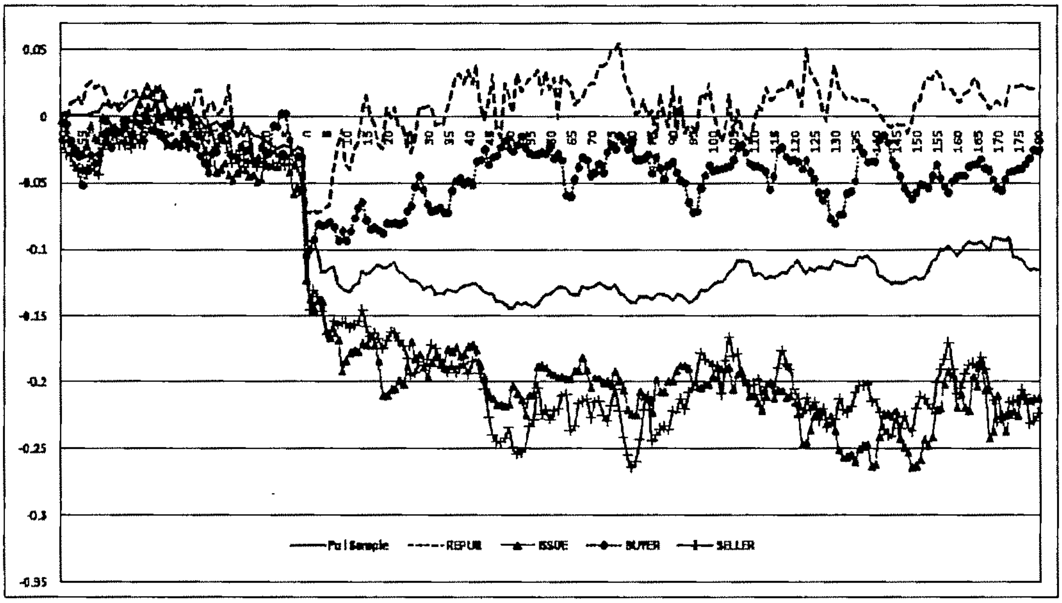
[8] Note that *BUYER* and *SELLER* are negatively correlated by construction, as are *ISSUE* and *REPUR*, because when one is positive, the other is necessarily zero.

[9] Abnormal returns are calculated by the difference between security *i*'s return and the value-weighted market return.

FIGURE 1
Cumulated Abnormal Returns around the Restatement Announcement for the Full Sample and for the Sample Partitioned on Net Corporate Trading and Net Insider Trading



See Appendix A for variable definitions.

announcement. We examine two separate trading windows, the five-day return (−2 to 2) centered on the restatement announcement, and a trading window that starts three days after the restatement announcement and extends to 60 trading days after the restatement announcement (3 to 60). We extend beyond the five-day window to better understand if there is also a delayed response to the informed trading signals, as suggested in Figure 1. For the long-window analysis, we require a control sample to account for the prior findings that informed trading activities are associated with future abnormal returns (e.g., Pontiff and Woodgate 2008). To construct the matched sample, we first identify all Compustat firms in the same three-digit SIC and fiscal year as each restatement firm. For each possible control firm, we compute *NIT* and *NCT* over the same window as the individual restatement firm. We then rank the restatement and potential control firms based on *NIT* quintile and retain only those control firms in the same *NIT* quintile as the restating firm. Finally, we select the control firm that is closest to the restating firm in the amount of *NCT*. This results in a sample that is matched on industry, year, and both types of informed trading. This sample is used in all tests where we use a long window, to control for the general returns patterns associated with these signals.

Table 3 provides stock return results for both the restatement and control samples. For both samples, we partition the net equity transitions and the net insider trading transactions into terciles and examine the cumulative abnormal return over the (−2,2) and (3,60) windows. By partitioning both net equity transactions and net insider trading transactions, we are able to examine the individual and joint effect of each signal on the price formation process following a restatement announcement.

We begin by discussing the main effects of insider buying/selling and equity issuances/repurchases (results are presented on the exterior of the tables). The results from Table 3, Panel A

TABLE 3
Cumulative Abnormal Stock Returns, Net Equity Issuance, and Net Insider Trading

Panel A: Restatement Sample

Terciles	Obs.	Mean (Median)	1 (*SELLER*) 172	2 223	3 (*BUYER*) 146	Difference (1−3)	Difference (1,1) − (3,3)
CAR (−2,2)							
Mean		−0.061	−0.092	−0.056	−0.051	−0.041$^{\#\#\#}$	
(Median)		(−0.049)	(−0.068)	(−0.035)	(−0.024)	(−0.044)$^{\#\#\#}$	
1 (*ISSUE*)	180	−0.084	−0.122	−0.055	−0.061		
		(−0.062)	(−0.080)	(−0.045)	(−0.056)		
2	181	−0.070	−0.077	−0.055	−0.051		
		(−0.037)	(−0.052)	(−0.034)	(−0.023)		
3 (*REPUR*)	180	−0.035	−0.056	−0.042	−0.014		
		(−0.024)	(−0.025)	(−0.033)	(−0.010)		
	Difference (1−3) Mean	−0.049***					−0.108†††
	Difference (1−3) (Median)	(−0.038)***					(−0.070)†††
CAR (3,60)							
Mean		−0.033	−0.067	−0.031	0.044	−0.111$^{\#\#\#}$	
(Median)		(−0.029)	(−0.068)	(−0.033)	(0.034)	(−0.102)$^{\#\#\#}$	
1 (*ISSUE*)	180	−0.053	−0.104	−0.061	−0.031		
		(−0.044)	(−0.086)	(−0.035)	(−0.021)		
2	181	−0.031	−0.051	−0.006	0.041		
		(−0.025)	(−0.041)	(−0.020)	(0.035)		
3 (*REPUR*)	180	0.063	−0.031	−0.014	0.073		
		(0.042)	(−0.024)	(0.024)	(0.041)		
	Difference (1−3) Mean	−0.116***					−0.177†††
	Difference (1−3) (Median)	(−0.086)***					(−0.127)†††

Panel B: Control Sample

Terciles	Obs.	Mean (Median)	1 (*SELLER*) 172	2 223	3 (*BUYER*) 146	Difference (1−3)	Difference (1,1) − (3,3)
CAR (−2,2)							
Mean		0.003	−0.002	0.004	0.006	−0.008	
(Median)		(−0.003)	(−0.003)	(0.000)	(0.003)	(−0.006)	
1 (*ISSUE*)	180	−0.005	−0.009	−0.002	0.004		
		(−0.003)	(−0.005)	(−0.002)	(0.001)		
2	181	0.002	−0.002	0.002	0.006		
		(−0.003)	(−0.003)	(−0.002)	(0.003)		
3 (*REPUR*)	180	0.011	0.011	0.010	0.011		
		(0.005)	(0.005)	(0.005)	(0.004)		

(continued on next page)

TABLE 3 (continued)

Terciles	**Obs.**	**Mean (Median)**	**1 (*SELLER*) 172**	**2 223**	**3 (*BUYER*) 146**	**Difference (1−3)**	**Difference (1,1) − (3,3)**
	Difference (1−3) Mean	−0.016*					−0.020†
	Difference (1−3) (Median)	(−0.008)					(−0.009)
CAR (3,60)							
Mean		0.002	−0.016	−0.007	0.016	−0.032*	
(Median)		(−0.010)	(−0.009)	(−0.006)	(0.012)	(−0.022)	
1 (*ISSUE*)	180	−0.015	−0.023	−0.015	−0.005		
		(−0.012)	(−0.010)	(−0.005)	(0.004)		
2	181	−0.006	−0.016	−0.013	0.016		
		(−0.010)	(−0.008)	(−0.012)	(0.014)		
3 (*REPUR*)	180	0.014	−0.007	0.011	0.021		
		(0.013)	(0.010)	(0.012)	(0.011)		
	Difference (1−3) Mean	−0.029*					−0.044†
	Difference (1−3) (Median)	(0.025)					(−0.021)

*, **, *** Indicates that tercile 1 (*ISSUE*), and tercile 3 (*REPUR*) are significantly different at the 10 percent, 5 percent, and 1 percent levels, respectively, two-tailed test.

#, ##, ### Indicates that tercile 1 (*SELLER*), and tercile 3 (*BUYER*) are significantly different at the 10 percent, 5 percent, and 1 percent levels, respectively, two-tailed test.

†, ††, ††† Indicate that cell (1,1), and cell (3,3) are significantly different at the 10 percent, 5 percent, and 1 percent levels, respectively, two-tailed test.

t-tests are used for means and Wilcoxon signed rank tests are used for medians. See Appendix A for variable definitions.

are consistent with our predictions across both time horizons. Specifically, the market responds less negatively to firms with prior repurchases and net insider buying, and these firms continue to experience greater returns going forward for at least 60 days. For example, firms in the top and bottom tercile of issuers of equity (*ISSUE* and *REPUR*) experience a differential change in market value over the (−2,2) day window (−8.4 percent versus −3.5 percent). These results persist in the (3,60) window (−5.3 percent versus 6.3 percent). Taken together, the market response is significantly more negative for issuing firms than for repurchasing firms in both windows. Insider trading follows a similar pattern.[10] There is a significant difference in five-day returns for firms with net selling (*SELLER*) versus net buying (*BUYER*) of −9.2 percent versus −5.1 percent. This relation is magnified in the (3,60) day window, where sellers returns average −6.7 percent and buyers average 4.4 percent.

We next examine the joint signal provided by insider buying/selling and equity issuance/repurchases (results are in the interior of the tables). These results provide further evidence that

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[10] Note that terciles of insider trading are not equally populated. Tercile 2 represents all firms with zero insider transactions, and contains 223 observations.

TABLE 4

Multivariate Regression Examining the Effects of Informed Trading on the Market Reaction to Accounting Restatements over Trading Days (−2,2)

Variable	Prediction	Coefficient			
Intercept		−0.058***	−0.050***	−0.020*	−0.018*
Informed Trading Information					
NCT	+	0.064***	0.057***	0.044***	
NIT	+	0.035***	0.032***	0.031***	
NCT_NONDISC					0.008
NCT_DISC					0.056***
NIT_NONDISC					0.009
NIT_DISC					0.033***
Prompter of the Restatement					
P_COMP	+		−0.014	−0.007	−0.008
P_AUD	−		−0.022**	−0.023**	−0.018*
P_SEC	−		−0.002	−0.003	−0.000
Severity of the Restatement					
CORE	−		−0.004	−0.002	−0.004
LENGTH	−		−0.016	−0.011	−0.011
EM	−		0.180	0.164	0.162
Controls					
LEV	?		0.000	0.000	0.013
BM	?		0.012	0.009	0.009
EP	?		−0.001	−0.006	−0.003
CFO	?		0.035***	0.031**	0.034**
ACC	?		−0.012	−0.012	−0.011
INT_COV	?		−0.000	−0.000	−0.001
ASSETS	?		0.000	0.000	0.000
PRIOR_RET	−		−0.007	−0.009	−0.009
EA	?		−0.003	−0.001	−0.002
UE	+		0.513*	0.507*	0.501*
Forward-Looking Information					
FRAUD	−			−0.044***	−0.045***
SEC_ENFORCE	−			−0.011*	−0.012*
FIRE	−			−0.006	−0.009
CLASS-ACTION	−			−0.027**	−0.028**
Adj. R^2		3.43%	12.93%	14.19%	15.76%
Obs.		541	541	541	541

*, **, *** Indicates significance at the 10 percent, 5 percent, and 1 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). Significance tests are based off of robust standard errors clustered by firm. See Appendix A for variable definitions.

informed trading reduces the uncertainty associated with restatements, and that each signal contains some unique information. In particular, the *REPUR_BUYER* firms exhibit a −1.4 percent return over the (−2,2) day window, while the *ISSUE_SELLER* firms exhibit a −12.2 percent return—a statistically and economically significant difference of −10.8 percent. A similar pattern is exhibited in the joint cells of the (3,60) day-time horizon window (−10.4 percent versus 7.3 percent) and for the difference between the cells (−17.7 percent), providing additional evidence of the importance of informed trading signals for restatement returns.

Table 3, Panel B provides the same information for the control sample. We use the control sample to provide additional assurance that it is the combination of the informed trading and the restatement that results in the observed return patterns. Consistent with the results in Table 3, Panel A, we observe greater five-day returns for *REPUR* (1.1 percent) than for *ISSUE* (−0.5 percent), significant at the 10 percent level. At the (3,60) day window we see similar patterns, (1.4 percent versus −1.5 percent). Panel B also shows that, among control firms, there is no significant difference at the five-day horizon (0.6 percent for *BUYER* versus −0.2 percent for *SELLER*). However, over the (3,60) window, the difference in returns becomes significant (1.6 percent for *BUYER* versus −1.6 percent for *SELLER*). The difference in the joint effects in the control sample are significantly negative for the (−2,2) and (3,60) windows at −2.0 percent and −4.4 percent, respectively, which are in the same direction but smaller in magnitude and significance ($p = 0.10$) than the results for the restatement firms. The results in Panel B mirror those in Pontiff and Woodgate (2008). Overall, the findings in Table 3 provide strong initial evidence of an association between informed trading and restatement returns, but this specification does not control for other possible omitted variables, nor does it address the direction of the causality.

Regression Analysis

Table 3 reveals evidence of a less negative market reaction to restatements for *REPUR* and *BUYER* firms, and a more negative reaction for *ISSUE* and *SELLER* firms. However, neither analysis controls for the other implications of informed trading on accounting restatements, which are shown to be significant in Table 2. We address this by estimating a multivariate regression on the pooled restatement sample over the five-day window (−2,2). Specifically, we estimate the following:

$$\begin{aligned} CAR(-2,2) = {} & a_0 + a_1 NCT + a_2 NIT + f(\textit{prompter of the restatement}) \\ & + f(\textit{severity of the restatement}) + f(\textit{controls}) \\ & + f(\textit{forward-looking information}) + \varepsilon. \end{aligned} \tag{1}$$

Equation (1) includes additional variables that relate to the prompter of the restatement, the severity of the restatement, or forward-looking information. These variables were described previously and are defined in Appendix A. Consistent with prior research, we include controls such as leverage (*LEV*), book-to-market (*BM*), performance (*CFO*), accruals (*ACC*), size (*ASSETS*), the abnormal returns during the period the firm was in violation of GAAP (*PRIOR_RET*), whether the restatement announcement is within a three-day window of the earnings announcement (*EA*), and the amount of unexpected earnings if the restatement announcement coincides with an earnings announcement (*UE*). If informed trading differentially affects the market's price formation around restatement announcements as we have predicted, then a_1 and a_2 should be significantly positive.

Table 4 reports the estimation of reduced and full versions of Equation (1). We provide three versions of the model, starting with column 1, which contains only the informed trading variables. We then progressively add the set of controls in columns 2 and 3, where column 2 includes all variables except the forward-looking ones, and column 3 includes all variables in Equation (1).[11]

In general, the results in Table 4 are consistent with H1a and H1b. Column 1 shows that net insider buying and net repurchases lead to smaller decreases in market values, whereas net insider selling and net issuances lead to larger decreases in market values. Column 2 includes variables that have been shown in previous studies to affect the market's reaction to restatement announcements.

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[11] All regressions use robust standard errors clustered by firm.

Consistent with prior research (Palmrose et al. 2004), we find evidence that restatements prompted by the auditor (*P_AUD*) lead to a more negative market reaction to the restatement announcement. None of our severity measures appear to be incrementally significant factors in determining the market reaction to restatements. With regard to the other variables, we find *CFO* to be significant, where stronger *CFO* leads to less negative market reactions to the restatement announcement. Finally, the coefficient on *UE* is positive and significant, suggesting that the greater the unexpected earnings the more positive the market response.[12]

Column 3 of Table 4, Panel A includes the forward-looking information variables. The magnitude and significance of the other variables are consistent with those from columns 1 and 2. All of the forward-looking variables are negative; however, only *FRAUD*, *SEC_ENFORCE*, and *CLASS-ACTION* are significantly different from zero. *FRAUD* has the largest coefficient in the regression model (−0.044), indicating a significant penalty for restatements that are due to fraud.[13] In summary, the results from the columns 1 through 3 are consistent with the notion that informed trading has an important role in the market's response to announced restatements and the subsequent price-formation process with and without controlling for restatement prompter, severity, and forward-looking information. Specifically, the market reacts more (less) favorably to firms and managers who have recently increased (decreased) their equity holdings.

Although columns 1–3 document a significant association between returns and the levels of informed trading, as predicted in H1a and H1b, these results do not address the reverse causality discussed previously. This issue is addressed in H2a and H2b and is tested in column 4 by separating insider and corporate trades into those that have been disclosed by the restatement date and those that have not.[14] To achieve this separation, we exploit the filing date requirements for insider and corporate informed trading. Prior to August 27, 2002, insiders were not required to report their trades to the SEC until the tenth day of the month following the transaction. This allowed insider trading to go unreported for up to approximately 40 calendars days. Subsequent to this date, insiders were required to report within two business days. This change, resulting from SOX, had implications for the informativeness of insider trades, with insider trades becoming more informative with the timelier disclosure (Brochet 2010). The pre-SOX period provided a large window whereby restatement announcements could fall between the insider transaction date and the date the trade was disclosed. Thus, there will be a significant number of trades in the pre-SOX period that were undertaken but not yet disclosed by the restatement date. We compare the insider transactions date, SEC receipt date, and restatement date to classify trades as disclosed and non-disclosed.[15] Specifically, if both the transaction date and the SEC filing date are prior to the restatement date, then the trade is classified as disclosed. In contrast, if the transaction date is prior to the restatement date but the SEC filing date is after the restatement date, then the trade is classified as non-disclosed.

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[12] We also redefine *UE* using an alternative window of (−2,2) instead of (−1,1) and we obtain similar results.

[13] When *FRAUD* is not included in the model, all of the other forward-looking variables increase in magnitude and are significant. This suggests that *FRAUD* explains much of the variation in CEO firings, litigation, and SEC enforcement actions associated with restatements.

[14] In untabulated results we estimated a 2SLS model for *NIT*. The challenge in estimating this model and a model for corporate trading is the difficulty in constructing adequate instruments to use. While the results produced from these models were consistent with there not being reverse causality, we had difficulty in finding suitable instruments for the manager's expected reaction to the restatement. As an alternative approach, we re-estimate our analyses using only the post-2004 portion of our sample. The benefit of focusing on this subsample is that it is subsequent to the SEC rule change that requires the 8-K to be filed within four business days of the company becoming aware that prior financial statement can no longer be relied upon. This analysis continues to confirm our results. However, we cannot be sure that the four-day rule is an adequate reflection of what managers knew and when they became aware of such information.

[15] Huddart et al. (2007) use a similar procedure to classify firms into those that tend to disclose insider trading and those that do not. We adapt this procedure by classifying the specific trades as disclosed or not, which allows us to better address the issue of reverse causality in our setting.

For corporate trading, activity on the open market is not reported until the filing of the 10K/10Q. After Match 15, 2004, equity repurchases must be disclosed in a table for each month during the quarter in accordance with Rule 10b-15. Prior to this rule change, corporate repurchases were reported in aggregate on a quarterly basis. We therefore define corporate trading as disclosed if it occurs prior to the quarter in which the restatement takes place. Corporate trading that occurs during the quarter in which the restatement occurs are classified as non-disclosed. Disclosed trades are labeled *NCT_DISC* and *NIT_DISC*, whereas those that were not disclosed until after the restatement announcement are labeled *NCT_NONDISC* and *NIT_NONDISC*. Note that, for restatements released concurrent with the earnings announcement, all corporate trades taking place in the quarter that the earnings announcement relates to will be classified as disclosed, because shares outstanding will be known at that date.[16]

The estimated model containing disclosed and non-disclosed informed trading is reported in the final column of Table 4. The results in this column support H2a and H2b. Specifically, we find that the disclosed informed trading activity is driving the results observed in the previous columns, whereas the non-disclosed informed trading does not appear to have any effect on the market's response to the restatement announcement.[17] These results support the notion that the market is using the disclosed informed trading signals as of the restatement date to price the restatement, and that the results are not solely driven by managerial trading in anticipation of the expected return. Taken together, the results presented in Table 4 provide strong evidence that disclosed informed trading is an input in the market's valuation response to restatement announcements.

Additional Specifications

The results in Table 4 aggregate the magnitude and direction of informed trading, thereby assuming symmetric responses for buying (repurchasing) and selling (issuing). Our next specification allows for asymmetric responses by separating these two effects so that we can learn whether the market differentially prices buying and selling. Specifically, we estimate the following model:

$$\begin{aligned} CAR(-2,2) = {} & a_0 + a_1 REPUR\_D + a_2 ISSUE\_D + a_3 BUYER\_D + a_4 SELLER\_D + a_5 REPUR \\ & + a_6 ISSUE + a_7 BUYER + a_8 SELLER + f(\mathit{prompter\ of\ the\ restatment}) \\ & + f(\mathit{severity\ of\ the\ restatement}) + f(\mathit{controls}) \\ & + f(\mathit{forward\text{-}looking\ information}) + \varepsilon. \end{aligned} \tag{2}$$

The informed trading variables of interest are captured using both indicator variables and truncated continuous variables. *REPUR_D*, *ISSUE_D*, *BUYER_D*, and *SELLER_D* are either equal to 1 or 0 depending on whether the firm was in the top or bottom tercile of net equity issuance or net insider trading. For example, *REPUR_D* is equal to 1 if the firm is in the top tercile of net equity issuance, and 0 otherwise. The indicator variables allow us to examine the extent to which the act of corporate repurchasing, corporate issuing, insider buying, or insider selling differ in the pricing of accounting restatements. We also are interested in whether the intensity of the informed trading is an important factor. Therefore, we include the continuous truncated variables *REPUR*, *ISSUE*, *BUYER*, and *SELLER*, as defined previously. This specification allows us to examine both the act of informed trading (i.e., indicator variables) and the intensity or magnitude of the trading (i.e., continuous variables) and how they differ based on the specific informed trading signal.

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[16] Our sample consists of 275 (104) firms with disclosed (non-disclosed) insider trades and 233 firms with no insider trades. The sum of the three groups is greater than 541 because some firms have both disclosed and non-disclosed trades.

[17] Untabulated results indicate that the coefficient on *NCT_NONDISC* (*NIT_NONDISC*) is significantly different from *NCT_DISC* (*NIT_DISC*) at the 1 percent level.

If stock repurchases differentially affect investors' pricing of restatements relative to the middle tercile of firms, then we expect a_1 to be significantly positive. Furthermore, if the amount of shares repurchased is an important factor beyond the presence of a stock repurchase, then we expect a_5 to be significantly positive. The same logic applies for issuance of equity (a_2 and a_6), insider buying (a_3 and a_7), and net selling by insiders (a_4 and a_8).

Table 5 reports results from estimating Equation (2) for the (−2,2) day window. We provide four different columns of results; each is either a reduced or full version of Equation (2). The first two columns include only the variables of interest. Consistent with Figure 1 and Table 3, the results provide consistent evidence that firms that are net repurchasers (*REPUR_D*) or insiders that are net buyers (*BUYER_D*) exhibit smaller decreases in market values, whereas firms that are net equity issuers (*ISSUE_D*) or insiders that are net sellers (*SELLER_D*) exhibit significantly greater decreases in market value. This evidence is consistent with more negative reactions to accounting restatements when managers and firms reduced their equity holdings during the period preceding the restatement announcement. Moreover, the slope coefficients are also significant and in the predicted directions. This suggests that the intensity of the informed trading is also an important factor above and beyond the firm's engagement in informed trading.

These results continue to hold for the other specifications. In column 3, when the restatement is prompted by the auditor (*P_AUD*), the market reaction to the restatement is statistically negative. In addition, restatements that involve core earnings (*CORE*) are negatively priced. Both the length of the misstatement period and the magnitude of the restatement do not appear to be incrementally significant factors in determining the market reaction to restatements. With regard to the other control variables, we find that only *CFO*, *PRIOR_RET*, and *UE* are significant. Similar to Equation (1), the greater the cash flow from operations, the less negative is the restatement reaction. Moreover, the greater the abnormal returns during the misstatement period (*PRIOR_RET*), the more negative the market reaction to the restatement, consistent with Badertscher et al. (2010). Finally, consistent with the results in Table 4, the coefficient on *UE* is positive and significant. The fourth column of Table 5 adds the forward-looking information variables, and all relations from column 3 continue to hold. In addition, *SEC_ENFORCE*, *FRAUD*, and *CLASS-ACTION* are negative and significant.

The last column is a re-estimation of column 4 using only those informed trades that were disclosed prior to the restatement announcement date. Because Table 4 reports that non-disclosed trades are insignificant, for brevity we only report the results of the disclosed trades. In untabulated results, we run the analysis including both disclosed and non-disclosed trades and find that the non-disclosed trades for all eight informed trading variables are significantly less than the coefficients on the disclosed trades, and are insignificantly different from zero. Therefore, Table 5 also shows that disclosed informed trading activity is driving our main results, whereas non-disclosed informed trading does not appear to have an effect on the market's response to the restatement announcement. Overall, the results from Table 5 support the results in Table 4, and also provide evidence that the aggregate results are not due to one direction of informed trading (i.e., selling), and that both direction and magnitude matter.

Our next specification examines the role of informed trading in the post-restatement return period, covering 3 to 60 days after the restatement. Because we use a longer window, we control for the general effect of informed trading on future returns. We therefore compare the informed trading

TABLE 5

Multivariate Regression Examining the Effects of Informed Trading on the Market Reaction to Accounting Restatements over Trading Days (−2, 2)

		Full Sample				
Variable	**Prediction**	**Coefficient**				**Disclosed Trades**
Intercept	?	−0.055***	−0.053***	−0.039***	−0.020*	−0.020*
Informed Trading Information						
REPUR_D	+	0.026**	0.021**	0.019*	0.021*	0.021*
ISSUE_D	−	−0.029***	−0.024***	−0.023**	−0.022**	−0.019*
BUYER_D	+	0.020**	0.020**	0.020*	0.019**	0.022**
SELLER_D	−	−0.031***	−0.037***	−0.033***	−0.028**	−0.033***
REPUR	+		0.206*	0.350*	0.329*	0.295*
ISSUE	−		−0.029***	−0.026**	−0.027**	−0.028**
BUYER	+		0.021**	0.026*	0.027*	0.028*
SELLER	−		−0.041***	−0.036**	−0.032*	−0.036**
Information about Management						
P_COMP	+			−0.011	−0.007	−0.006
P_AUD	−			−0.017**	−0.024*	−0.021*
P_SEC	−			−0.004	−0.000	−0.001
Severity of the Restatement						
CORE	−			−0.014**	−0.014**	−0.013**
LENGTH	−			0.010	0.010	0.010
EM	−			0.101	0.121	0.113
Controls						
LEV	?			0.000	0.000	0.000
BM	?			0.012	0.010	0.010
EP	?			−0.004	−0.005	−0.006
CFO	?			0.035***	0.032***	0.031**
ACC	?			−0.012	−0.012	−0.011
INT_COV	?			−0.000	−0.000	0.000
ASSETS	?			0.000	0.000	0.000
PRIOR_RET	−			−0.013*	−0.012*	−0.013*
EA	?			−0.003	−0.004	−0.004
UE	+			0.447*	0.479*	0.482*
Forward-Looking Information						
FRAUD	−				−0.043***	−0.041***
SEC_ENFORCE	−				−0.017*	−0.016*
FIRE	−				−0.008	−0.010*
CLASS-ACTION	−				−0.020*	−0.023**
Adj. R^2		5.39%	7.68%	16.72%	18.24%	18.87%
Obs.		541	541	541	541	275

*, **, *** Indicates significance at the 10 percent, 5 percent, and 1 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). Significance tests are based off of robust standard errors clustered by firm. See Appendix A for variable definitions.

coefficients between the restatement sample and our matched sample after controlling for other variables that may impact the subsequent market reaction to the restatement announcement.

We examine the following model:[18]

$$\begin{aligned} CAR(3,60) = {} & (1 + \mathrm{CONTROL})[\mathrm{a}_0 + \mathrm{a}_1\mathrm{REPUR\_D} + \mathrm{p} + \mathrm{a}_2\mathrm{ISSUE\_D} + \mathrm{a}_3\mathrm{BUYER\_D} \\ & + a_4 SELLER\_D + a_5 REPUR + a_6 ISSUE + a_7 BUYER + a_8 SELLER \\ & + f(\textit{prompter of the restatment}) + f(\textit{severity of the restatement}) + f(\textit{controls}) \\ & + f(\textit{forward-looking information})] + \varepsilon. \end{aligned} \tag{3}$$

Our primary interest is in determining whether informed trading is an important factor in explaining the post-restatement price movement after controlling for the general tendency of stocks to drift upward (downward) following repurchases and insider buying (issuances and insider selling). Therefore, we focus on the *DIFF* column in Table 6, which shows the difference between the restatement sample and control sample coefficients. For instance, *REPUR_D* is 0.028 for the restatement sample, but is only 0.005 for the control sample, resulting in *DIFF* being 0.023, which is statistically significant. This result indicates that *REPUR_D* is both economically and statistically related to post-restatement abnormal returns even after controlling for the general tendency of stocks to drift upward following a repurchase. The results indicate that *DIFF* is statistically significant for all of the indicator variables (*REPUR_D*, *ISSUE_D*, *BUYER_D*, and *SELLER_D*), but that *DIFF* is statistically significant only for *ISSUE* and *SELLER* among the truncated continuous variables. In other words, the presence of informed trading (indicator variables) is an important factor in explaining the price reaction following a restatement after controlling for the general tendency of stocks to drift following insider-trading activities. Yet, while the magnitude of corporate repurchases and insider buying impacts the restatement sample and control sample similarly, the market reacts more negatively to the magnitude of corporate issuance and insider selling for the restatement sample relative to the control sample.

Because we are examining the time period after the restatements, it is important to ensure that our results are not driven by subsequent informed trading. Therefore, in addition to the control variables included in Equations (1) and (2), we also include two variables that capture subsequent informed trading. Specifically, we include *NIT_POST60* and *NCT_POST60*, where *NIT_POST60* (*NCT_POST60*) is the amount of net insider trading (net corporate trading) during the (3,60) day time horizon. Although *NCT_POST60* is insignificant, *NIT_POST60* is positive and significant, indicating that the market views post-restatement announcement insider buying (selling) as a positive (negative) attribute.

Overall, the results in Table 6 indicate that stock repurchases (issuances) mitigate (increase) the negative reaction subsequent to the restatement announcement after controlling for the general tendency of stocks to drift upward (downward) following repurchases and insider buying (issuances and insider selling) and after controlling for a variety of factors that prior research has shown to affect the market's response to an accounting restatement.

V. CONCLUSION

In this study, we examine whether informed trading is a credible signal that reduces the information risk and downward revisions in expected future cash flows associated with accounting restatements. Examining the short-window stock returns around the restatement announcement and for the 60 trading days following the restatement, we find a significantly less (more) negative reaction to accounting restatements associated with prior stock repurchases (issuances) and prior

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[18] We also conducted this analysis using a partially interacted model (see Riedl 2004), obtaining similar results.

TABLE 6

Multivariate Regression Examining the Effects of Informed Trading on the Market Reaction to Accounting Restatements over Trading Days (3, 60)

		Coefficient		
Variable	**Prediction**	***RESTATE***	***CONTROL***	***DIFF***
Intercept	?	−0.022*	0.001	
Informed Trading Information				
REPUR_D	+	0.028*	0.005	0.023**
ISSUE_D	−	−0.035**	−0.015*	−0.020**
BUYER_D	+	0.017*	0.001	0.016*
SELLER_D	−	−0.036***	−0.015*	−0.021**
REPUR	+	0.161	0.099	0.062
ISSUE	−	−0.022*	−0.006	−0.016*
BUYER	+	0.005	0.003	0.002
SELLER	−	−0.025**	−0.007*	−0.018**
Information about Management				
P_COMP	+	−0.016*	—	
P_AUD	−	0.011	—	
P_SEC	−	0.000	—	
Severity of the Restatement				
CORE	−	−0.008	—	
LENGTH	−	0.010	—	
EM	−	0.091*	—	
Controls				
LEV	?	−0.014*	0.011	
BM	?	−0.004	0.003	
EP	?	−0.001	−0.005	
CFO	?	0.008	0.018*	
ACC	?	−0.052*	−0.015	
INT_COV	?	−0.000	0.000	
ASSETS	?	0.000	0.000	
PRIOR_RET	−	−0.009	0.007	
EA	?	0.003	0.003	
UE	+	0.447*	0.673*	
NIT_POST60	+	0.012*	0.003	
NCT_POST60	+	0.000	0.000	
Forward-Looking Information				
FRAUD	−	−0.037***	—	
SEC_ENFORCE	−	−0.015*	—	
FIRE	−	−0.009	—	
CLASS-ACTION	−	−0.032**	—	
Adj. R^2		25.49%		
Obs.		1,082		

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*, **, *** Indicates significance at the 10 percent, 5 percent, and 1 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). *DIFF* indicates the difference in coefficients between the *RESTATE* sample and the *CONTROL* sample. Significance tests are based off of robust standard errors clustered by firm. See Appendix A for variable definitions.

insider buying (selling). These results are incremental to the general tendency of stocks to drift upward (downward) following repurchases (issuances), and hold after controlling for both the economic severity of the restatement and the potential reverse causality between informed trading and restatement announcements. Also, the signals appear to be impounded into price to a greater degree in the shorter windows relative to the long window around the date the restatement is announced. This evidence suggests that the market begins to look for corroborating or contradicting evidence regarding the future performance of the firm once the restatement is announced. In summary, our evidence suggests that informed trading activities are credible signals that affect the information risk premium charged by investors or the decrease in expected future cash flows when firms restate their earnings. Prior insider selling and equity issuances increase this effect, leading to substantially more negative price reactions, whereas insider buying and repurchases appear to reduce the effect.

An important feature of our study is addressing the possibility of reverse causality driving our findings. For example, it could be that insiders adjust their trades in anticipation of the expected market reaction, which would result in a similar association. We address this possibility by exploiting the reporting regulations surrounding insider and corporate trading to classify trades as disclosed or not disclosed on the event date. Importantly, we find an association between restatement returns and informed trading only for the trades that are disclosed by the restatement date. Although this is not a perfect control for reverse causality, we think it substantially mitigates the concerns that the causality runs in the opposite direction.

Previously, the joint-signaling literature had only examined the importance of corporate transactions that credibly signal future prospects in the context of corporate events (SEOs and dividend policy changes). We extend this notion to include events that involve accounting information. Our results suggest that the market looks for other signals of the underlying viability of the firm when a restatement announcement occurs, and uses this information to help interpret the implication of the restatement announcement. Our findings document a relation between corporate finance decisions and accounting information. Specifically, net equity issuances and net insider buying provide a context to help investors interpret and price the restatement. Future research could consider introducing recent firm decisions from corporate finance as context builders from which to improve the interpretation of accounting information.

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APPENDIX A

Variable Definitions[a]

Variable		**Definition**
ACC	=	firm *i*'s total accruals, calculated as income before extraordinary items (#18) at year-end $t-1$ minus cash flow from operations (#308) at year-end $t-1$ divided by total assets (#6) at year-end $t-2$;
ASSETS	=	firm *i*'s total assets (#6) at year-end $t-1$;
BM	=	firm *i*'s book-to-market ratio, calculated as book value of equity (#60) at year-end $t-1$ divided by market value of equity (#25 × #199) at year-end $t-1$;
BUYER	=	*NIT* when *NIT* is positive, and 0 otherwise. The greater the net insider buying, the larger *BUYER* becomes;
BUYER_D	=	an indicator variable equal to 1 if the firm is in the top 1/3 of *NIT*, and 0 otherwise;
CFO	=	firm *i*'s cash flow from operations (#308) at year-end $t-1$ divided by total assets (#6) at year-end $t-2$;
CLASS-ACTION	=	an indicator variable equal to 1 if according to the Securities Class-Action Clearinghouse (Stanford Law School database) the firm has been named in a federal class-action securities fraud lawsuit over the one-year period following the restatement announcement, and 0 otherwise;

(continued on next page)

APPENDIX A (continued)

Variable		Definition
CONTROL	=	an indicator variable equal to 1 if firm *i* is a control firm and has all necessary Compustat and CRSP data, and 0 otherwise. We obtained the control sample by conducting a one-to-one match of a non-restatement firm for each restatement firm by fiscal year, three-digit SIC code, *NIT* quintile, and closest *NCT*;
CORE	=	an indicator variable equal to 1 if revenue and/or expense was impacted by the restatement, and 0 otherwise;
DIFF	=	indicates the difference in coefficients between the *RESTATE* sample and the *CONTROL* sample;
EA	=	an indicator variable equal to 1 if the restatement announcement is within a three-day window (−1,0,1) of the earnings announcement, and 0 otherwise;
EM	=	the total amount of earnings management, calculated as the difference between the originally reported income before extraordinary items minus restated income before extraordinary items scaled by total assets at year-end $t-1$;
EP	=	firm *i*'s earnings-to-price ratio, calculated as income before extraordinary items (#18) at year-end $t-1$ divided by shares outstanding (#25) at year-end $t-1$ all divided by price (#199) at the end of year $t-1$;
FIRE	=	an indicator variable equal to 1 if the CEO or CFO was fired over the one-year period following the restatement announcement, and 0 otherwise;
FRAUD	=	an indicator variable equal to 1 if the restatement is fraudulent or a misrepresentation, and 0 otherwise. This classification is from two sources: first, for restatement announcements from 2002–2008 Audit Analytics has a variable called *RES_FRAUD* that is equal to 1 if the restatement noted "Financial fraud or misrepresentations"; and second, for restatement announcements prior to 2002, this variable was hand-collected using Lexis-Nexis, http://www.sec.gov, and 10kwizard.com, using keyword search "fraud," "fraudulent" or "fictitious" on all restatement firms' press releases and in restated financial statements that describe the nature of the restatement;
INT_COV	=	firm *i*'s interest coverage, calculated as the inverse of firm *i*'s interest coverage ratio, calculated as interest expense (#15) in year $t-1$ divided by operating income before depreciation (#13) in year $t-1$;
ISSUE	=	$-1 \times$ *NCT* when in the bottom 1/3 of *NCT*, and 0 otherwise. The greater the issuance of equity, the larger *ISSUE* becomes;
ISSUE_D	=	an indicator variable equal to 1 if the firm is in the bottom 1/3 of *NCT*, and 0 otherwise;
LENGTH	=	total number of years between the restatement announcement date and the beginning of the misstatement period;
LEV	=	firm *i*'s leverage ratio, calculated as short-term debt (#34) plus long-term debt (#9) at year-end $t-1$, scaled by total assets at year-end $t-1$;
NCT	=	firm *i*'s net corporate trading, calculated as the natural log of the number of adjusted shares outstanding on the first day the firm was deemed to have engaged in non-GAAP accounting minus the number of adjusted shares outstanding on the restatement announcement date. A positive amount for *NCT* implies the firm is repurchasing shares, while a negative number implies the firm is issuing shares. For firm *i* we obtain from CRSP the number of shares outstanding and the factor to adjust shares outstanding. We compute the number of real shares outstanding, which adjusts for distribution events such as splits and rights offerings, as follows: We first compute a total factor at time *t*, which represents the cumulative product of the CRSP-provided factor *f* up to time *t* inclusive: $TotalFactor^t = \Pi_{i=1}^{t}(1+f_i)$. We compute the number of shares outstanding adjusted for splits and other events as: *AdjustedShares* = *SharesOutstanding/TotalFactor*. This measure is a logged version of the variable used by Stephens and Weisbach (1998);

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APPENDIX A (continued)

Variable **Definition**

NCT_DISC = firm *i*'s net issue of stock, calculated as the natural log of the number of adjusted shares outstanding from first day the firm was deemed to have engaged in non-GAAP accounting minus the amount of adjusted shares outstanding at the quarter-end prior to the restatement announcement. A positive amount implies the firm was repurchasing shares, while a negative number implies the firm is issuing shares;

NCT_NONDISC = firm *i*'s net issue of stock, calculated as the natural log of the number of adjusted shares outstanding from the quarter-end prior to the restatement announcement minus the number of adjusted shares outstanding two days prior to the restatement announcement date. A positive amount implies the firm was repurchasing shares, while a negative number implies the firm is issuing shares;

NCT_POST60 = firm *i*'s net issue of stock (*NCT*) from day 3 to day 60, where day 0 is the restatement announcement date;

NIT = firm *i*'s net insider trading from Thomson Financial, calculated as the difference between the number of shares purchased and the number of shares sold between the first day the firm engaged in non-GAAP accounting until two days prior to the restatement announcement divided by the sum of the number of shares purchased and number of shares sold during the same period. A positive number indicates net insider buying, while a negative number indicates net insider selling. The Insider Filing Database compiled by Thomson Financial is designed to capture all insider activities as reported on SEC Forms 3, 4, and 5. Following prior studies, we focus on open-market purchases and sales as reported in Appendix A of Form 4 (Ke et al. 2003; Richardson et al. 2004). To ensure data quality, we delete all insider trading records that are assigned cleanse code "A" or "S" by Thomson Financial. Thomson Financial verifies the accuracy and reasonableness of insider reported figures using references to external sources;

NIT_DISC = firm *i*'s net insider trading from Thomson Financial, calculated as the difference between the number of shares purchased and the number of shares sold divided by the sum of the number of shares purchased and number of shares sold during the same period, where the transaction date and the SEC receipt date occur prior to two days before the restatement date. The SEC receipt date is the date the trade becomes public. These trades are all disclosed to the public prior to the restatement date. A positive (negative) number indicates net insider buying (selling);

NIT_NONDISC = firm *i*'s net insider trading from Thomson Financial, calculated as the difference between the number of shares purchased and the number of shares sold divided by the sum of the number of shares purchased and number of shares sold during the same period, where the transaction date is prior to two days before the restatement date but the SEC receipt date is after the restatement date. The SEC receipt date is the date the trade becomes public. These trades are not disclosed to the public prior to the restatement date. A positive (negative) number indicates net insider buying (selling);

NIT_POST60 = firm *i*' s net insider trading activity from day 3 to day 60, where day 0 is the restatement announcement date;

P_AUD = an indicator variable equal to 1 if the auditor prompted the restatement, and 0 otherwise;

P_COMP = an indicator variable equal to 1 if the company prompted the restatement, and 0 otherwise;

P_SEC = an indicator variable equal to 1 if the SEC prompted the restatement, and 0 otherwise;

(continued on next page)

APPENDIX A (continued)

Variable		**Definition**
PRIOR_RET	=	cumulative abnormal stock return over the misstatement period, where misstatement period is the period the firm was engaging in non-GAAP accounting choices;
REPUR	=	*NCT* when in the top 1/3 of *NCT*, and 0 otherwise. The greater the repurchase of equity, the larger *REPUR* becomes;
REPUR_D	=	an indicator variable equal to 1 if the firm is in the top 1/3 of *NCT*, and 0 otherwise;
RESTATE	=	an indicator variable equal to 1 if firm *i* appears in either of the GAO (2002, 2006) restatement reports or in the Audit Analytics database and where the restatement is described as the result of an accounting irregularity by Hennes et al. (2008) or Audit Analytics, and 0 otherwise;
SEC_ENFORCE	=	an indicator variable equal to 1 if the restatement resulted in an SEC enforcement action against the firm over the one-year period following the restatement announcement, and 0 otherwise;
SELLER	=	−1 × *NIT* when *NIT* is negative, and 0 otherwise. The greater the net insider selling, the larger *SELLER* becomes;
SELLER_D	=	an indicator variable equal to 1 if the firm is in the bottom 1/3 of *NIT*, and 0 otherwise; and
UE	=	unexpected earnings calculated as income before extraordinary items (#18) in quarter q minus income before extraordinary items in quarter $q-4$ divided by shares outstanding. This is 0 for all restatement announcements that do not fall within a three-day window (−1,0,1) of the earnings announcement date.

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[a] All continuous variables are winsorized at 1 percent and 99 percent. All items beginning with # are from Compustat.

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The Determinants and Performance Effects of Managers' Performance Evaluation Biases

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ABSTRACT: This study examines the determinants and performance effects of centrality bias and leniency bias. The results show that managers respond to their own incentives and preferences when subjectively evaluating performance. Specifically, information-gathering costs and strong employee-manager relationships positively affect centrality bias and leniency bias. The findings also indicate that performance evaluation biases affect not only current performance ratings, but also future employee incentives. Inconsistent with predictions based on the agency perspective, the results show that managers' performance evaluation biases are not necessarily detrimental to compensation contracting. Although centrality bias negatively affects performance improvement, the evidence does not reveal a significant negative relation between leniency bias and performance. Rather, leniency bias is positively associated with future performance, which is consistent with the behavioral argument that bias can improve perceived fairness and, in turn, employee motivation.

Keywords: *subjectivity; performance evaluation; centrality bias; leniency bias.*

Data Availability: *Data used in this study cannot be made public due to a confidentiality agreement with the participating firm.*

I. INTRODUCTION

The objective of this study is to examine the determinants and performance effects of managers' performance evaluation biases. Understanding the causes and performance implications of bias is important for executives in charge of incentive design, as it can help them determine how much discretion to allow managers in performance-based compensation plans and, hence, can lead to improved incentive contracting.

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I focus on two important forms of performance evaluation bias: centrality bias and leniency bias (Prendergast 1999). Centrality bias is the tendency to compress performance ratings, resulting in less variance in ratings than is warranted by variance in performance, while leniency bias is the tendency to inflate employees' performance ratings (Saal et al. 1980). Although numerous studies document the existence of both forms of bias (Kingsbury 1922; Kneeland 1929; Landy and Farr 1980; Jawahar and Williams 1997; Moers 2005), empirical evidence on the determinants and performance effects of managers' performance evaluation biases is scarce. This study extends the current literature by focusing on (1) what causes managers to display bias in performance ratings, and (2) how biased ratings influence employees' incentives.

To address the above questions, I examine the incentive plan of a financial service provider. In particular, I study the contract design and performance data of five branch offices for 2003 and 2004. I start my analysis by examining whether centrality bias and leniency bias are driven by managers' incentives and preferences. More specifically, I examine whether a factor based on economic theory—information-gathering costs—and a factor rooted in the behavioral view—the strength of the employee-manager relationships—increase centrality bias and leniency bias.[1] Second, I analyze how centrality bias and leniency bias affect employee incentives. Economic (agency) theory predicts that both biases decrease employee performance, as they negate the incentive effect of performance-based compensation contracts. In contrast, behavioral theory predicts that either bias can have a positive effect on employee motivation and performance if it enhances the perceived fairness of the incentive system.

The results show that managers respond to their own incentives and preferences when they subjectively evaluate performance. Specifically, findings indicate that information-gathering costs and strong employee-manager relationships positively affect centrality bias and leniency bias. The results also show that bias influences the incentives provided by performance-based compensation contracts. Contrary to predictions based on the agency perspective, the evidence indicates that managers' performance evaluation biases are not necessarily detrimental to compensation contracting. That is, although centrality bias negatively affects performance improvement, the evidence does not reveal a significant negative relation between leniency bias and performance. Rather, leniency bias positively affects performance improvement. This result is consistent with the behavioral argument that bias can positively influence incentives by enhancing the perceived fairness of an incentive system.

This study makes several contributions to the performance evaluation and compensation literature. First, this study answers several calls for empirical evidence on the effect of managers' personal rating incentives on rating behavior (e.g., Murphy and Cleveland 1991; Harris 1994). I show that the personal costs associated with rating employee performance decrease the accuracy of performance ratings. This finding indicates that subjective performance ratings are explained in part by managers' incentives and preferences. Yet, the discretion in the performance evaluation system allows managers to maintain that their evaluations were only based on employee performance. Consequently, in order to improve rating accuracy, research should focus not only on the rating ability of managers, but also on their rating incentives.

Second, to my knowledge, this is the first study to empirically investigate how biased performance ratings influence the effectiveness of performance-based incentive contracts. Prior studies establish the existence of centrality bias and leniency bias, but do not analyze the consequences of these biases on future performance. My analysis shows that managers' performance evaluation biases are not necessarily detrimental for compensation contracting, as is assumed in previous literature (e.g., Landy and Farr 1980; Rynes et al. 2005). Rather, I find that leniency bias positively affects employees' incentives consistent with the behavioral prediction that improved fairness perceptions can enhance the effectiveness of performance-based compensation contracts.

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[1] Since examining the effect of information-gathering costs on bias from the behavioral perspective would not lead to different hypotheses, and examining the effect of the strength of the employee-manager relationship on bias from an economic perspective would not lead to alternative predictions, I do not present the information-gathering hypotheses as exclusively economic hypotheses or the effects of the strengths of the employee-manager relationship as exclusively behavioral hypotheses.

Finally, this study provides a detailed description of the salient features of an incentive system for non-executive employees, as well as both managers' and employees' reactions to this system. This analysis sheds light on how non-management employees are compensated, an area in which detailed information is generally scarce (Indjejikian 1999).

Section II reviews prior research on performance evaluation biases in compensation contracting and develops the study's testable hypotheses. The research setting and empirical design are presented in Section III. Section IV presents the results. Finally, Section V concludes and discusses directions for future research.

II. HYPOTHESES

Most studies that deal with subjectivity in compensation contracts focus on the determinants of subjectivity. These studies examine the role of subjectivity in incentive systems and show that introducing subjectivity improves contracts by mitigating incentive distortions or reducing risk (Baker et al. 1994; Baiman and Rajan 1995; Hayes and Schaefer 2000; Gibbs et al. 2004). However, the introduction of manager discretion can also give rise to a number of problems, the most prominent of which is rating inaccuracy.[2]

A long line of research dating back to the 1920s examines rating accuracy in subjective performance appraisal (e.g., Kingsbury 1922; Kneeland 1929; Thorndike 1949; Barrett 1966; Landy and Farr 1980). These studies show that subjective performance ratings are susceptible to random error, systematic biases (e.g., halo and stringency), and bias due to race, sex, ethnicity, and other personal attributes of employees (Feldman 1981). Two systematic biases that have especially received a lot of attention in this stream of literature are centrality bias and leniency bias. Centrality bias refers to the tendency of managers to provide ratings that fail to adequately discriminate among subordinates in terms of their respective performance level (Motowidlo and Borman 1977). Leniency bias refers to the tendency of managers to provide their subordinates with higher ratings than is warranted by their performance (Saal and Landy 1977). For example, Bretz et al. (1992) document that while most organizations' evaluation systems comprise five levels, generally only three levels are used, with 60 to 70 percent of an organization's workforce rated in the top two performance levels. In a more formal investigation of leniency bias and centrality bias, Moers (2005) finds that, on average, performance ratings on the subjective dimension are higher and closer to the median rating than performance ratings on the objective dimension. This finding is consistent with the prediction that superiors provide more lenient and compressed ratings when subjectively assessing performance.

Determinants of Managers' Performance Evaluation Biases

Although there is abundant evidence that managers tend to apply biases in performance ratings, there is less evidence of what causes managers to display these biases. Most work that examines the determinants of performance evaluation biases focuses on managers' ability to rate accurately (Banks and Murphy 1985). For example, several research studies examine how rater training (Smith 1986; Woehr and Huffcutt 1994) and different types of rating formats (Landy and Farr 1980) influence rating accuracy. However, little attention has been given to examining how managers' personal incentives influence rating behavior. In particular, while several theoretical studies highlight the importance of rating incentives in performance evaluation (e.g., Holmstrom 1981; Murphy and Cleveland 1991; Harris 1994), virtually no empirical investigations explore this effect. The current study helps to fill this void by examining how managers' personal rating incentives affect their tendency to bias performance ratings.

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[2] Inaccurate performance ratings are clearly not the only type of potentially negative consequences of subjectivity in performance-based compensation contracts. Other concerns, such as uncertainty about measurement criteria, are also likely to influence the effectiveness of performance-based compensation contracts (Bol 2008).

Managers' Rating Incentives

Several analytical models in the agency literature analyze subjective performance evaluation performed by principals who are the residual claimants of the firm (e.g., Bull 1983; MacLeod and Malcomson 1989; Baker et al. 1994). These models show that residual claimants have incentives to under-report when subjectively assessing performance in order to keep compensation costs down. However, since most companies are multi-layered, the principals in most principal-agent relationships are not residual claimants (Prendergast 1999). As a result, their financial incentives to under-report are limited or nonexistent. However, this does not mean that principals have no incentive to use their discretion in the performance evaluation process to their own benefit. Principals (i.e., managers) are predicted to still take their own preferences into account when they appraise performance. That is, they have incentives to minimize the time and effort invested in the performance evaluation process, avoid confrontations, prevent damage to personal relationships, and limit criticism, and these preferences will influence the managers' ratings behavior (Harris 1994). Specifically, I hypothesize that they lead to centrality bias and leniency bias.

To make unbiased subjective assessments, managers need to invest time and effort in gathering information on employee performance. Monitoring employee behavior can be very costly to the manager, especially if the manager cannot observe the employee's actions (e.g., because of physical location) and thus must dedicate time exclusively to monitoring the employee. Since managers have a preference to limit their time and effort spent on performance evaluation, performance information will likely be incomplete when information-gathering costs are high (Higgins and Bargh 1987).

I argue that this lack of complete information leads to centrality bias. Since the probability that an employee is extremely good or bad is statistically low, managers are likely to compress ratings when they possess incomplete information, as compression increases the probability that their estimation based on imperfect information is close to the true performance level. This prediction is in line with Bernardin and Villanova (1986), who find that managers self-report that one of the reasons they rate inaccurately is lack of time spent on performance appraisal. It is also in line with Freeberg (1969), who demonstrates in a laboratory experiment that rating accuracy increases when raters are able to view more employee behavior that is *directly relevant* to the performance under evaluation. However, while these prior studies document the importance of time and effort spent on performance appraisal for rating accurately, they do not show that high information-gathering costs result in bias.

I also hypothesize that the lack of complete information leads to leniency bias. When employees are unsatisfied with their rating, they will likely ask their manager for a justification of the performance rating they have received. This process is time-consuming, and managers therefore have incentives to avoid these discussions (Levy and Williams 2004). A meeting to discuss performance ratings will be especially costly to the manager, when s/he does not have complete information on the employees' performance. In such a situation, it will be even harder to explain and justify the provided performance rating, and the manager might even have to collect additional information on the employee's past performance.[3] In order to avoid these discussions with employees who believe that their ratings are too low, managers will have a tendency to bias ratings upward, especially when they do not have complete information on the employee's performance (Friedrich 1993).[4] This argument is consistent with Bernardin and Villanova (1986), who find that the majority of surveyed managers indicate that the desire to avoid discussions with subordinates is a significant source of rating inaccuracy. In a similar vein, Bernardin et al. (2000) find that individuals give more lenient ratings when they have a strong desire to avoid discussions. However, these studies have not linked higher information-gathering costs to increased cost of providing justifications and leniency bias.

Evaluating performance can also put a psychological burden on managers (Villanova et al. 1993). In particular, communicating harsh, but accurate performance ratings can damage personal relationships and lead to criticism, in addition to time-consuming and uncomfortable confrontations (Napier and Latham 1986). I predict that managers anticipate these negative reactions when rating performance and consequently offer compressed and lenient ratings. In doing so, managers are likely to feel that they are being kind to their employees and as a result expect to be sheltered from criticism (Barrett 1966).[5] Thus, the tendency to give lenient and compressed ratings is a defensive mechanism applied to avoid the ramifications of deserved, but tough performance ratings.

Prior survey research finds evidence indicating that managers' rating behavior is influenced by personal relationships and fear of criticism. For example, Lawler (1990) finds that managers are concerned that making accurate performance ratings will hurt their relationships with subordinates. Similarly, Murphy and Cleveland (1991) suggest that the possibility of employee criticism is a frequently voiced concern of managers. The present study extends this research by using archival data to provide empirical evidence that stronger employee-manager relationships lead to increased centrality bias and leniency bias.

Hypotheses

Taken together, the above discussion predicts that managers bias performance ratings to reduce the personal costs of evaluating employee performance. Specifically, I hypothesize that the cost of gathering information and the psychological burden of confronting employees with whom the manager has a personal relationship, lead to centrality bias and leniency bias in performance ratings. More formally:

H1a: Information-gathering costs positively affect centrality bias.

H1b: Information-gathering costs positively affect leniency bias.

H1c: Strong employee-manager relationships positively affect centrality bias.

H1d: Strong employee-manager relationships positively affect leniency bias.

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[3] This argument is consistent with Mero et al. (2003). They show that, in a laboratory setting, participants who are asked to justify their ratings collect more complete employee performance information.

[4] Consistent with the situation of the company used in this study, I assume there is no set limit to the amount of compensation that managers can award. Hence, there is no bonus pool system where increasing one employee's compensation means lowering another employee's compensation.

[5] Although commonly assumed, it is not necessarily true that lenient and compressed ratings protect managers from criticism—e.g., exceptional high performers might complain about being buried among the less talented (Barrett 1966).

Employee Incentives and Managers' Performance Evaluation Biases

Although, to my knowledge, no prior research empirically investigates the performance implications of performance evaluation biases, numerous studies examine how bias can be reduced by training managers in performance evaluation (Smith 1986; Woehr and Huffcutt 1994) or improving rating scales (Landy and Farr 1980). These studies explicitly or implicitly assume that biases are detrimental *per se* for performance evaluation (Landy and Farr 1980; Rynes et al. 2005). To assess the validity of this assumption, I study whether managers' evaluation biases are negative for compensation contracting.

I start by using an agency perspective to analyze the effect of bias on employee incentives.[6] Specifically, I examine how the influence of centrality bias and leniency bias on the link between pay and performance affects employee incentives. However, given the behavioral perspective that the effectiveness of an incentive system is not necessarily determined only by its pay-for-performance sensitivity, I also analyze the effect of bias on employee incentives from a behavioral perspective. Specifically, I analyze how centrality bias and leniency bias influence the perceived fairness of the compensation plan and, consequently, employees' future incentives.

Link between Pay and Performance

One of the main objectives of using a performance-based compensation system is to motivate employees to exert effort (Rees 1985).[7] According to agency theory, linking pay to performance motivates employees to exert greater effort to improve performance because increased performance results in increased pay (Holmstrom 1979; Shavell 1979). However, employees will be motivated to increase effort only when they expect improved performance to translate into more compensation (Holmstrom and Milgrom 1991). When managers assess performance subjectively, this translation is likely impacted, as managers have both motive and opportunity to bias ratings and biases disrupt the link between pay and performance (Prendergast 1999). Therefore, I predict that performance evaluation biases influence the incentive effect of the performance-based compensation plan.

Centrality bias creates a disproportionate pay-to-performance ratio. Since compression is achieved by deflating the rating of above-average performers and inflating the rating of below-average performers, above-average performers have to provide a larger performance increase to get the same rating increase as below-average performers. This ratings compression negatively affects incentives because it reduces the likelihood that above-average performers will believe that the value of a marginal rating increase (i.e., additional compensation) outweighs the costs of improving performance sufficiently to receive this increase.

The inflated ratings of below-average performers also provide little incentive to improve performance. Although the performance rating difference between below- and above-average performers is relatively small (because of the compression), the real performance increase needed to move from below to above average is relatively large (Cichello et al. 2009). In order to move to an above-average rating, employees would have to exert sufficient effort to overcome the switch from inflated to deflated performance assessments. Hence, moving from below- to above-average ratings will take a considerable real performance increase, while the additional compensation resulting from the rating increase will be relatively small, making it less likely that the benefits will outweigh the costs. In sum, compressed ratings reduce incentives for both above- and below-average performers.

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[6] In this study I assume that the levels of centrality bias and leniency bias are not optimal equilibrium choices. I work under the assumption that managers are on the path toward equilibrium and that it is therefore possible to observe cross-sectional differences in performance (Hogarth and Reder 1987; Camerer et al. 2004). This is not an unrealistic assumption in this setting as the performance-based compensation system was first introduced in 2003 (my first year of analysis).

[7] Another important objective of performance measurement is to differentiate between highly skilled and less skilled employees. Although the effect of less-than-optimal personnel decisions might be severe, investigating the effect of bias on selection issues is beyond the scope of this study.

In the case of leniency bias, each level of performance receives a higher rating (and thus more compensation). This leniency negatively affects incentives, because the employee has to exert less effort to reach the same level of compensation. The effect of leniency bias is comparable to lowering the performance targets, which reduces employee incentives (Blanchard et al. 1986). Note that this argument is only valid if the total compensation level is not fixed (as at the company investigated in this study). When evaluations are all biased upward, but the total compensation level is fixed (e.g., through the use of a budget or bonus pool), leniency bias will have no effect on compensation and, consequently, employee effort will not be affected.

Employee Perception of Fairness

Behavioral research shows that the perceived fairness of performance-based compensation plans has a significant impact on employee incentives (Akerlof and Yellen 1988; Blinder and Choi 1990; Colquitt et al. 2001). Contrary to predictions based on the agency perspective, behavioral research argues that, in order to be motivated, employees care not only about how much compensation they receive, but also about how their performance rating compares to their expectations and to the ratings of others. If an employee perceives his/her rating to be unfair, then he/she will react negatively toward the compensation system and not be motivated by it (Greenberg 1990; Cohen-Charash and Spector 2001; Colquitt et al. 2001). Performance evaluation biases influence the perceived fairness of the compensation system because biases change the outcome distribution of the compensation plan.

The effect of centrality bias on perceived fairness likely depends on whether the employee's performance is above or below average. Above-average performers become less motivated when they receive roughly the same compensation as employees who do not perform as well. As predicted by equity theory (Adams 1963), individuals compare their own reward-to-input ratio to the corresponding ratios of their peers. If the ratios are unequal, then the party whose ratio is lower will feel upset and dissatisfied. This negatively influences incentives, as individuals will lower their performance in order to restore a feeling of equity (Garland 1973).

The situation is different for below-average performers, as compression positively influences their ratings. Since most employees believe that their own performance is above-average (Beer and Gery 1972; Meyer 1975), providing below-average employees with their true comparative rating could be counterproductive in terms of motivation and performance (Pearce and Porter 1986). Although compression does not result in below-average performers receiving the above-average rating they think they deserve, it likely has a more positive effect on perceived fairness than uncompressed ratings. Hence, the compressed ratings provide below-average performers with a rating that is more similar than an uncompressed rating to their own assessment of their relative performance. Consequently, below-average performers will consider compressed ratings to be less unfair and will react less negatively.

The behavioral perspective expects leniency bias to positively affect perceived fairness by increasing the congruence between the rating the employee thinks s/he deserves and the rating s/he actually receives. Individuals have a tendency to over-estimate their abilities relative to their supervisors (McFarlane Shore and Thornton 1986; Harris and Schaubroeck 1988).[8] As a result, employees are likely to perceive a non-inflated rating as unfair. When an employee believes that his/her performance warrants a higher rating than the rating he/she received, the employee will have a negative reaction against the compensation system, which weakens incentives (Akerlof and Yellen 1988; Colquitt et al. 2001). Thus, since lenient ratings are more in line with the expectations of self-over-estimating employees, leniency bias can increase perceived fairness and strengthen incentives.

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[8] Abundant evidence exists in the psychology literature that most people over-estimate their abilities and past achievements (Arkin et al. 1980), they tend to recall their successes more than their failures (Mischel et al. 1976), and they have the tendency to be unrealistically optimistic about their future (Weinstein 1980).

Hypotheses

Based on the above discussion, I distinguish two primary mechanisms through which managers' performance evaluation bias can influence employee incentives: (1) through its effect on the link between pay and performance, and (2) through its effect on perceived fairness.

For centrality bias, the agency perspective predicts a negative incentive effect, as it creates a disproportionate pay-to-performance ratio. Consistent with the agency perspective, the behavioral view predicts that centrality bias negatively affects the incentives of above-average performers because it creates unequal reward-to-input ratios between peers. However, for below-average performers, the behavioral view predicts that centrality bias has a positive effect on incentives because it enhances the perceived fairness of the compensation system. Hence, for below-average performers, the theoretical predictions for centrality bias lead to a composite hypothesis (which I state in null form).[9] Separating the hypotheses for above- and below-average performers, I formally state:

> **H2a:** Centrality bias negatively affects the performance incentives of above-average performers.
>
> **H2b:** Centrality bias does not affect the performance incentives of below-average performers.

According to the agency perspective, leniency bias negatively influences employee incentives, as it weakens the link between pay and performance. The behavioral perspective, in contrast, predicts that lenient ratings improve perceived fairness and strengthen incentives. This again leads to a composite hypothesis, stated in null form:

> **H2c:** Leniency bias does not affect employee performance incentives.

III. RESEARCH DESIGN

Research Setting

To test the hypotheses, I use data from one of the main financial service providers (FSP) in The Netherlands.[10] FSP serves over nine million customers, with a total asset value of approximately €475 billion in 2005, the last year of the sample period.

As part of an initiative to move to more results-oriented management, FSP introduced a new incentive system for its branch offices in 2003. The new performance-based compensation system consists of a fixed salary and a bonus of up to 15 percent of the fixed salary. The size of the bonus and a potential fixed salary increase are determined by the employee's end-of-year overall performance rating, which is the weighted average of an output-based score and a competence-based score.[11] The output score is based on three to six equally weighted measures that capture employee output. Examples are "consumption rate," "market share," and "cross-selling ratio" (see Figure 1). The competence score is also based on three to six equally weighted measures. The competencies of "cooperative behavior" and "customer focus" are standard for all, while the manager chooses the other measures to capture the behavioral attributes that are essential to the employee's tasks.

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[9] Although stating hypotheses in the null form is less informative, I use the null form because it was unclear *a priori* whether the agency or the behavioral perspective would be predictive of the examined relationships.

[10] The Netherlands is, in many respects, very similar to the U.S. when it comes to incentive contracting (see Abernethy et al. 2004; Indjejikian and Matejka 2006; Bouwens and Van Lent 2007). One noted difference, however, is the less prominent use of performance-based compensation systems in The Netherlands, which, according to Jansen et al. (2009), is explained by the relatively lower score on Hofstede's masculinity dimension (Dutch people have a lower preference for competitiveness, achievement, and material success).

Sample

The analyses employ two years of proprietary archival data on the incentive system of five branch offices of FSP.[12] I hand-collect completed performance documents for all employees of the five branches. The analyses are limited to those individuals who are employed by FSP in both 2003 and 2004 and to departments that make significant use of objective measures (at least 25 percent), where the classification of objective versus subjective measures is discussed below.[13] The managers in the sample range from top management to middle management (not including the general director of the branch), while the included subordinates vary from senior private banker to assistant account managers.[14] Lower-level positions such as tellers and custodians are not included in the sample. The sample-selection procedure results in a total of 396 (198 per year) completed performance documents.

The performance documents provide information on the employee's position, department, and manager. This information allows me to identify reference groups—i.e., employees who work together, perform similar tasks, and are evaluated by the same manager. There are 69 reference groups, the average number of employees in a reference group is 6, and each manager oversees an average of 1.2 reference groups.

The performance documents also indicate the performance measures, performance ratings, and the old and new compensation. Besides determining the performance measures,[15] managers must provide an extensive description on the performance document of how they are going to measure performance when performance is quantifiable. They are also required to indicate the target for each performance level for these quantitative measures. I classify output-based measures as objective or subjective, based on this information. An output-based measure is only classified as objective if the document states the formula that the manager uses to quantify output. It is important to note that the classification is based on how the manager chooses to evaluate performance (i.e., measure objectively or assess subjectively). The classification is not based on whether a dimension *could* be objectively measured with the right measurement system.[16] Because the HR department collects the

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[11] Figure 1 illustrates the relation between the overall performance rating and the bonus percentage.

[12] The five offices provide a representative mix of regions, office size, and area type (ranging from rural to urban).

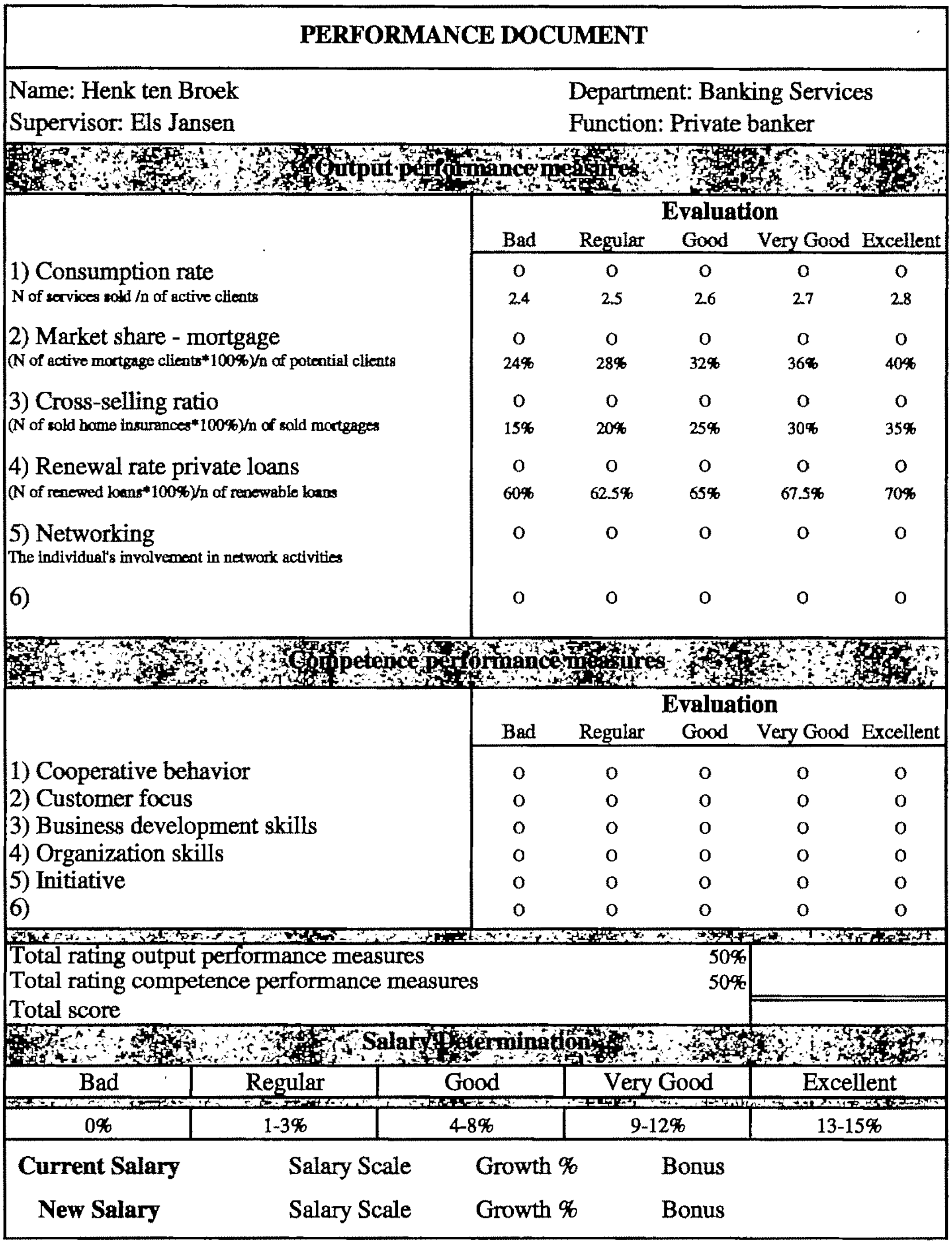
[13] Using employees who were employed by FSP in both 2003 and 2004 might lead to selection bias because employees who left the company in 2003 are excluded from the sample. To examine this issue, I asked the HR managers to identify cases where employees had left the company because of the new system. Only a few isolated cases at one branch were identified.

[14] The average salary scale of the managers is 8.4 (range 5 to 12), while the average salary scale of the employees is 6.1 (range 3 to 11).

[15] To facilitate consistent use of the new system, the designers provide managers with a set of sample performance measures for each position. Managers, however, determine their employees' performance measure and targets independently and are free to use non-sample performance measures.

[16] In Figure 1, the first four output-based measures are classified as objective as the document clearly states how the output will be measured and what the specific targets are. The last measure, "networking," is classified as subjective because no details on measurement are provided.

FIGURE 1
The Performance Measurement Document



PERFORMANCE DOCUMENT

Name: Henk ten Broek	Department: Banking Services
Supervisor: Els Jansen	Function: Private banker

Output performance measures

	Evaluation				
	Bad	Regular	Good	Very Good	Excellent
1) Consumption rate N of services sold /n of active clients	○ 2.4	○ 2.5	○ 2.6	○ 2.7	○ 2.8
2) Market share - mortgage (N of active mortgage clients*100%)/n of potential clients	○ 24%	○ 28%	○ 32%	○ 36%	○ 40%
3) Cross-selling ratio (N of sold home insurances*100%)/n of sold mortgages	○ 15%	○ 20%	○ 25%	○ 30%	○ 35%
4) Renewal rate private loans (N of renewed loans*100%)/n of renewable loans	○ 60%	○ 62.5%	○ 65%	○ 67.5%	○ 70%
5) Networking The individual's involvement in network activities	○	○	○	○	○
6)	○	○	○	○	○

Competence performance measures

	Evaluation				
	Bad	Regular	Good	Very Good	Excellent
1) Cooperative behavior	○	○	○	○	○
2) Customer focus	○	○	○	○	○
3) Business development skills	○	○	○	○	○
4) Organization skills	○	○	○	○	○
5) Initiative	○	○	○	○	○
6)	○	○	○	○	○

Total rating output performance measures	50%	
Total rating competence performance measures	50%	
Total score		

Salary Determination

Bad	Regular	Good	Very Good	Excellent
0%	1-3%	4-8%	9-12%	13-15%

Current Salary	Salary Scale	Growth %	Bonus
New Salary	Salary Scale	Growth %	Bonus

performance documents and assesses whether they are used in accordance with the guidelines, it is unlikely that the managers used formula-based criteria and did not report them.[17] The competence measures are subjective by definition.

I also use information from a survey administered by FSP's compensation system designers. In August 2004, FSP surveyed a set of randomly selected employees from different branches to examine employee and manager reactions to the new system. In total, 161 employees returned and answered all questions of the survey (the performance information portion was optional). Of these respondents, only 55 qualify for my analysis because I require information on how performance is evaluated—objectively measured or subjectively assessed—in order to distinguish objective from subjective output-based measures. Unfortunately, FSP did not include this information in the survey. To avoid mistakenly labeling any measure as objective, I include only respondents who indicate in one of the survey questions that their output-based measures were very quantifiable. Because of anonymity, I am also unable to link the survey responses to the archival data.

Finally, I collect demographic information and interview several employees, managers, and compensation system designers to gain a better understanding of the company.

Variables

To examine the determinants of centrality bias and leniency bias, I measure the extent of bias applied to the ratings. Recall that centrality bias refers to the tendency of managers to provide ratings that fail to adequately discriminate between subordinates in terms of their respective performance level. Since I am interested in how much managers discriminate between *their* employees when subjectively evaluating performance (the amount of compression), I compare the compression in the subjective rating with the compression in the objective rating at the reference group level (i.e., subordinates who work together and have similar positions). I use reference groups instead of all employees evaluated by a specific manager, as employees are likely to compare themselves with colleagues in a similar position (Adams 1963; Meyer 1975).[18] Specifically, I calculate the ratio between the standard deviation of the objective ratings and the standard deviation of the subjective ratings of all employees in the reference group (*CEN_BIAS*). I capture leniency bias, the tendency of managers to provide their subordinates with higher ratings than is warranted by their performance, by comparing the manager's subjective performance assessments with the formula-based objective performance score. Specifically, I subtract the objective rating from the subjective rating (*LEN_BIAS*).[19]

The primary independent variables of interest are information-gathering costs and the strength of the employee-manager relationship. At FSP, some managers share their direct workspaces with their subordinates, while others work in close proximity but are unable to observe their subordinates directly. Moreover, some managers' daily tasks overlap to a large extent with those of their subordinates, while other managers never perform tasks similar to their subordinates' tasks. These factors influence the costs of gathering employee performance information. Specifically, for managers who share a workspace and overlap in duties, it takes relatively little time and effort to monitor their subordinates' performance. To capture these relatively lower information-gathering costs, I create a binary variable that codes managers as low in information-gathering costs if they share a workspace and overlap in duties with their subordinates, and high if they do not (*INFO_C*).[20] To make this classification, I examine the workspace layout at each branch office and compare the managers' job descriptions with their subordinates' job descriptions. The classification is double-checked by the HR manager of each branch and, in case of disagreement, we re-evaluate the case and reconcile the disagreement.

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[17] Interviews with managers and HR personnel confirm that managers put significant effort into completing the performance documents.

[18] During my interviews, employees confirmed that they had some, though not full, knowledge of their peers' ratings. Previous survey research also shows that employee knowledge on the rating distribution is a common characteristic of incentive systems (Bernardin and Villanova 1986).

[19] Results are robust to alternative specifications of leniency bias such as Max(subjective rating − objective rating, 0), (subjective rating/objective rating), and using the values of a residual model that controls for contract design and centrality bias.

I use three proxies to capture the strength of the employee-manager relationship. First, the strength of the relationship likely depends on the amount of time that the employee and manager have worked together. When the employee-manager relationship is relatively new, a close relationship between the two parties is less likely. To capture new employee-manager relationships, I include a binary variable that equals 1 if the employee or manager recently joined the company (*NEW_R*). Second, based on research that shows that individuals with similar demographic characteristics are more likely to develop a close relationship (Tsui and O'Reilly 1989), I include the employee-manager age difference (*DIF_AGE*) and a binary variable that indicates a gender difference between the manager and employee (*DIF_GEN*).

Finally, I measure each branch office's profit growth (*GROWTH*). Since financial resources are limited, managers will feel some pressure to keep compensation costs down, especially during economic downturns (Longenecker et al. 1987). By capturing the branch-level financial performance, I control for variation in this pressure. When examining the determinants of centrality bias, I also control for the number of employees in the reference group (*NR_REF*).[21]

To examine the performance effects of performance evaluation biases, I perform two separate analyses: one based on the archival data and one based on the survey data. For the archival-based analysis, the dependent variable performance improvement ($\Delta PERF$) is measured as the difference between the employee's objective (subjective and total) performance rating in 2003 and 2004. For the survey-based analysis, the dependent variable is employees' self-reported change in effort. More specifically, I proxy for performance improvement by using the employee's own assessment of how his/her effort is affected by the new incentive system (measured on a five-point scale, *EFFORT*). In both analyses, the main independent variables, leniency bias (*LEN_BIAS*) and centrality bias (*CEN_BIAS*), are measured as discussed above.[22]

As control variables, I include employee characteristics that are predicted to make an employee less sensitive to the incentives provided by the new system. I include a variable that indicates whether the employee has reached his/her salary scale limit (*MAX_SC*), as performance improvements beyond this point will only affect the bonus. Since part-time and older employees have differential career concerns, I include variables indicating part-time employees (*PART_T*) and employees older than 50 (*OLDER*), respectively. In the archival-based analysis, I also include a variable that indicates a job change (*DIF_JOB*) and variables that control for changes made to the design of the performance document (see Table 5).

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[20] Note that *INFO_C* does not refer to the seniority of the manager. Even more strongly, when comparing the salary scale of the managers (a proxy for seniority) in the low and high information-gathering costs groups, I find no significant difference in seniority. The mean scale for the managers when *INFO_C* is 0 (1) is 8.7 (8.2). *INFO_C* is also not picking up the difference in seniority between the manager and the employee. The mean difference in salary scale is 2.69 (2.68) when *INFO_C* is 0 (1).

[21] The introduction of additional variables that control for contract choices (e.g., the contractual weight placed on the subjective measures and the number of subjective measures used), seniority, or department leads to similar inferences (untabulated).

[22] The survey-based centrality bias proxy must be interpreted in light of the following limitations. Since FSP surveyed a random sample of employees, the centrality bias proxy is based on a randomly selected subset of the reference group. Moreover, since the participants were not asked to name their manager in the survey, I have to assume that all employees within a certain department of a specific branch were evaluated by the same manager.

IV. RESULTS

Summary statistics for the main variables indicate that the variance in the objective ratings is significantly larger than the variance in the subjective ratings in both 2003 and 2004 (see Tables 1 and 2). This is true for the variance in the entire sample (SD is 0.76 versus 0.46 in 2003 and 0.74 versus 0.45 in 2004) as well as for the average variance per reference group (mean SD is 0.48 versus 0.31 in 2003 and 0.63 versus 0.37 in 2004).

The descriptive statistics also show higher ratings on the subjective versus objective performance measures in 2003. Both the mean (2.94 versus 2.80) and the median (3.00 versus 2.75) are higher. Pairwise observations show that the subjective rating exceeds the objective rating for 59 percent of the employees in 2003. However, in 2004, this relationship reverses, as the mean (3.14

TABLE 1

Descriptive Statistics

	2003					**2004**				
	Mean	**SD**	**Median**	**Range**	**n**	**Mean**	**SD**	**Median**	**Range**	**n**
Overall performance rating	2.87	0.52	2.86	1.6–4.7	198	3.20	0.50	3.23	1.6–4.4	198
Objective performance rating[a]	2.80	0.76	2.75	1.0–5.0	198	3.28	0.74	3.33	1.0–5.0	198
Subjective performance rating[a]	2.94	0.46	3.00	1.5–4.3	198	3.14	0.45	3.13	2.1–4.6	198
Total # of performance measures	9.70	1.77	10.00	5–12	198	10.68	1.49	11.00	5–12	198
# of objective performance measures	4.04	1.35	4.00	1–6	198	4.48	1.30	5.00	2–6	198
# of subjective performance measures	5.66	1.36	6.00	2–9	198	6.20	1.06	6.00	3–8	198
% of total rating objectively determined	44.33	8.72	50.00	25–50	198	44.37	7.57	50.00	25–50	198
% of total rating subjectively determined	55.67	8.72	50.00	50–75	198	55.63	7.57	50.00	50–75	198
Employee age	38.39	8.60	37	23–60	198	39.39	8.60	38	24–61	198
Contract hours	32.68	6.52	36	12–40	198	32.27	6.80	36	12–40	198
Tenure	11.40	9.50	7.00	1–38	198	12.40	9.50	8.00	2–39	198
Profit growth[b]	1.09	2.62	1.60	−6.2–11.9	198	5.68	18.21	1.27	−20–67	198
Size reference group	5.35	2.41	5.00	2–11	37	6.19	3.02	5.00	2–11	32
SD objective rating per reference group[c]	0.48	0.27	0.49	0.0–0.9	37	0.63	0.30	0.58	0.3–1.2	32
SD subjective rating per reference group[c]	0.31	0.17	0.29	0.1–0.7	37	0.37	0.20	0.31	0.1–1.0	32

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[a] t-tests for mean-comparison indicate significant differences between the mean objective and subjective performance ratings in both 2003 and 2004 ($p < 0.01$ in both cases).

[b] The percentage difference between each branch office's profit in the current year and the branch office's profit in the previous year.

[c] t-tests for mean-comparison indicate significant differences between the mean SD in the objective and subjective performance ratings per reference group in both 2003 and 2004 ($p < 0.01$ in both cases).

TABLE 2

Correlation between Variables

Panel A: 198 Observations for 2003

	1	2	3	4	5	6	7	8	9	10
1. Overall performance rating										
2. Objective performance rating	0.90***									
3. Subjective performance rating	0.80***	0.47***								
4. Total # of perf. measures	−0.14**	−0.11	−0.13*							
5. # of objective perf. measures	−0.12*	−0.17**	−0.02	0.65***						
6. # of subjective perf. measures	−0.06	0.03	−0.15**	0.66***	−0.15**					
7. % objectively determined	−0.10	−0.16**	0.02	0.10	0.52***	−0.39***				
8. Employee age	−0.02	−0.03	−0.03	−0.04	−0.02	−0.03	−0.03			
9. Work hours	0.18**	0.19***	0.12*	0.30***	0.13*	0.26***	0.04	−0.04		
10. Tenure	−0.03	−0.05	−0.03	−0.02	0.01	−0.03	0.09	0.73***	0.02	
11. Profit growth	−0.16**	−0.15**	−0.12	−0.12*	−0.05	−0.10	−0.01	0.04	−0.17**	0.11

Panel B: 198 Observations for 2004

	1	2	3	4	5	6	7	8	9	10
1. Overall performance rating										
2. Objective performance rating	0.88***									
3. Subjective performance rating	0.78***	0.41***								
4. Total # of perf. measures	−0.08	−0.08	−0.05							

(continued on next page)

TABLE 2 (continued)

	1	2	3	4	5	6	7	8	9	10
5. # of objective perf. measures	0.02	−0.03	0.07	0.72***						
6. # of subjective perf. measures	−0.14**	−0.08	−0.16**	0.53***	−0.21***					
7. % objectively determined	0.18***	0.10	0.19***	−0.05	0.57***	−0.77***				
8. Employee age	−0.22***	−0.25***	−0.09	0.04	−0.02	0.08	−0.06			
9. Work hours	0.14**	0.15**	0.11	0.10	0.08	0.04	−0.01	0.00		
10. Tenure	−0.13*	−0.18***	−0.02	0.06	0.01	0.07	−0.04	0.73***	0.06	
11. Profit growth	−0.08	−0.09	−0.04	−0.28***	−0.19***	−0.16**	−0.10	−0.01	0.08	−0.01

*, **, *** Denote statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

versus 3.28) and median (3.13 versus 3.33) subjective ratings are lower than the objective ratings, and in only 40 percent of the pairwise observations is the subjective rating higher.[23]

Consistent with Moers (2005), I investigate whether the centrality bias and leniency bias patterns hold after controlling for contract design and the characteristics of employees and managers. To examine compression, I use the ratio between the employee's overall objective (subjective) rating and the mean objective (subjective) rating of the reference group (*R_RATING* = Max (rating/mean rating, mean rating/rating) as the dependent variable. The main independent variable is an indicator that equals 1 if the rating is subjective ($I_{Subjectivity}$). To control for differences in contract design that can cause different effort allocations, I include the number of performance measures that the rating comprises (*NR_PM*) and the total weight placed on these measures (*WEIGHT*) (see Moers 2005). To control for the fact that compression might be driven by a certain type of employee and/or manager, I include several employee characteristics (age [*AGE*], gender [*GEN*], and part-time employment [*PART_T*]) and manager indicator variables ($I_{Manager}$). Year (Y_{2003}) and office indicator variables (I_{Office}) are also included.

Column (1) of Table 3 presents the estimation results of the OLS regression analysis with robust standard errors clustered by employee. Consistent with prior studies (e.g., Moers 2005), the significant negative coefficient on $I_{Subjectivity}$ indicates that the subjective performance ratings are more compressed than the objective ratings.

To investigate the presence of leniency bias, I use the employees' overall objective and subjective ratings (*RATING*) as the dependent variable and $I_{Subjectivity}$ as the main independent variable. The control variables are as specified above (for more details on specification and variable definition see Table 3).

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[23] The cumulative distribution functions of the subjective and objective ratings indicate that neither rating has a first-order stochastic dominance over the other rating.

Column (2) of Table 3 presents the results of the OLS regression analysis with robust standard errors clustered by employee. The coefficient of $I_{Subjectivity}$ is positive and significant at the 5 percent level, indicating that the subjective ratings are higher than the objective ratings, after controlling for relevant influences. Since the descriptive statistics show different patterns across the two sample years, I also perform annual analyses and find that, on average, the subjective ratings are not higher in 2004 (see Column (4) of Table 3).[24]

To investigate what might explain this apparent absence of leniency bias in 2004, I first identify that the 2004 ratings are higher, on average, than the 2003 ratings. These higher ratings are likely the result of substantially higher growth in the Dutch GDP in 2004 compared to 2003 (2.2 percent versus 0.3 percent). Consistent with this macroeconomic factor, actual profit growth exceeded budgeted growth in four of the five branches in 2004. This economic growth resulted in higher individual sales figures (frequently used objective measures) than anticipated. Consistent with this argument, I find a significant correlation between the extent to which branches surpass their budgeted growth and the objective performance scores of the employees of that particular branch ($\rho = 0.14$ and $p = 0.01$).[25]

Since supervisors have incentives to avoid negative employee reactions that often accompany low performance ratings (Latham 1986; Shore and Tashchian 2002), I examine whether leniency bias is more prominent for those employees whose objective ratings are relatively low. I split the sample into two groups, one with objective ratings above the average of the rating scale (3), and one below. I find that the subjective ratings are significantly higher than the objective ratings in the below-average group in 2003 and 2004, for both the mean rating (2.76 versus 2.20 in 2003 and 2.97 versus 2.35 in 2004) and the median rating (2.67 versus 2.33 in 2003 and 2.88 versus 2.50 in 2004).[26] Pairwise observations show that the subjective rating exceeds the objective rating for 86 percent of the employees in 2003 and for 87 percent of the employees in 2004.

The opposite pattern emerges in the above-average group. The subjective ratings are significantly lower than the objective ratings for both the mean (3.17 versus 3.64 in 2003 and 3.25 versus 3.75 in 2004) and the median (3.14 versus 3.60 in 2003 and 3.21 versus 3.67 in 2004). Pairwise observations show that the subjective rating exceeds the objective rating for 12 percent of the employees in 2003 and for 17 percent of the employees in 2004. These patterns continue to hold after controlling for contract design and employee and manager characteristics, as discussed above (see Columns (5) and (6) of Table 3). Hence, the overall results indicate that managers tend to engage in leniency bias and, consistent with managers wanting to avoid confrontations with low performers, this tendency is stronger when the objective measure is below the average of the rating

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[24] The observed pattern (59 percent higher subjective ratings in 2003 followed by 40 percent higher subjective ratings in 2004) could be the result of mean reversion. To examine this possibility, I regress the difference between the subjective and objective ratings in 2004 on the difference between the subjective and objective rating in 2003 ($(SUBJ\_R_{2004} - OBJ\_R_{2004}) = \alpha + \beta(SUBJ\_R_{2003} - OBJ\_R_{2003}) + \varepsilon$). A negative coefficient indicates mean reversion, while a positive coefficient indicates consistency in the sign of the difference between the subjective and objective rating over the years. The results show a positive significant coefficient of 0.31 ($p < 0.01$), indicating that mean reversion does not explain the pattern found.

[25] The survey data also indicate that the compensation system had an overall positive influence on effort and personal development. This positive incentive effect was corroborated in the interviews.

[26] t-tests for mean-comparison indicate significant differences between the mean objective and subjective performance rating for the below and above average of the rating scale group in both 2003 and 2004 ($p < 0.01$ in all cases).

TABLE 3

The Impact of Manager Subjectivity on Employee Performance Ratings

$$R\_RATING_{it} = \alpha_0 + \alpha_1 I_{Sub} + \alpha_2 WEIGHT_{it} + \alpha_3 NR\_PM_{it} + \alpha_4 AGE_{it} + \alpha_5 GEN_i + \alpha_6 PART\_T_{it} + \sum_{j=7}^{46} \alpha_j I_{Manager_j} + \sum_{k=47}^{50} \alpha_k I_{Office_k} + \alpha_{51} Y_{2003t} + \varepsilon_{it} \qquad (1)$$

$$RATING_{it} = \alpha_0 + \alpha_1 I_{Sub} + \alpha_2 WEIGHT_{it} + \alpha_3 NR\_PM_{it} + \alpha_4 AGE_{it} + \alpha_5 GEN_i + \alpha_6 PART\_T_{it} + \sum_{j=7}^{46} \alpha_j I_{Manager_j} + \sum_{k=47}^{50} \alpha_k I_{Office_k} + \alpha_{51} Y_{2003t} + \varepsilon_{it} \qquad (2)$$

Independent Variables[a]	*R_RATING* (1)	*RATING* (2)	*RATING* 2003 (3)	*RATING* 2004 (4)	*RATING* Below-2003 (5)	*RATING* Below-2004 (6)
$I_{Subjectivity}$	−0.10***	0.10**	0.29***	−0.10	0.66***	0.60***
	(−7.29)	(2.01)	(4.47)	(−1.46)	(8.88)	(5.79)
NR_PM	−0.01	−0.06**	−0.07**	−0.06	−0.02	0.07
	(−0.15)	(−2.36)	(−2.40)	(−1.01)	(−0.63)	(1.42)
WEIGHT	0.00	0.00	−0.00	0.00	−0.01**	−0.00
	(1.21)	(0.28)	(−0.72)	(0.74)	(−1.98)	(−1.06)
AGE	0.01**	−0.01***	−0.01	−0.01***	−0.01	−0.01
	(1.97)	(−2.54)	(−1.32)	(−2.83)	(−0.10)	(−0.76)
GEN	0.04*	−0.12	−0.09	−0.16	−0.18**	−0.33*
	(1.63)	(−1.30)	(−1.21)	(−1.23)	(−1.97)	(−1.69)
PART_T	0.03	−0.10	−0.10	−0.12	−0.21***	−0.17
	(1.02)	(−1.10)	(−1.17)	(−0.97)	(−2.52)	(−0.80)
Y_{2003}	0.01	−0.40***				
	(0.56)	(−9.50)				
Adj. R^2	0.18	0.29	0.40	0.24	0.59	0.56

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively. t-values are in parentheses, i = ratings, t = time, j = managers, k = offices, and n = 792 for Columns (1) and (2), n = 396 for Columns (3) and (4), n = 206 for Column (5), and n = 110 for Column (6).

[a] An intercept, as well as manager and office indicator variables are included but not reported.

Variable Definitions:

R_RATING = performance rating variation, measured as the ratio between employees' individual objective (subjective) performance rating, and the mean objective (subjective) performance rating of the reference group: Max ([rating/mean rating], [mean rating/rating]);

RATING = subjective or objective performance rating;

$I_{Subjectivity}$ = indicator variable that equals 1 if the observation refers to a subjective performance rating, and 0 otherwise;

NR_PM = number of objective (subjective) performance measures;

WEIGHT = contractual incentive weight on the objective (subjective) performance measures;

AGE = employee age;

PART_T = indicator variable that equals 1 if the employee works part-time, and 0 otherwise;

GEN = employee gender (0 for female and 1 for male); and

Y_{2003} = indicator variable that equals 1 if the observation relates to 2003, and 0 otherwise.

scale. Thus, the higher objective ratings in 2004 (only 28 percent received a rating under the average of the rating scale) explain why the ratings are less subject to leniency bias in 2004.[27]

In sum, the results indicate that managerial discretion leads to centrality bias, because the subjective ratings are significantly more compressed than the objective ratings. The evidence also indicates a pattern consistent with leniency bias, especially for those employees who perform below the average of the rating scale on the objective dimension.

Note that I draw these inferences in light of the following assumptions. First, I assume that the true variance in performance (without any performance evaluation bias) is, on average, similar for the objectively measured and the subjectively assessed elements, and that the variance in the objective performance ratings is, on average, similar to the true performance variance in the sample. In a similar respect, I assume that the objective ratings are, on average, unbiased or at least significantly closer to the true performance value than the subjective ratings. I also assume that, on average, employees' abilities on the objective elements are similar to their abilities on the subjective elements. This assumption is appropriate in this setting because the subjectively assessed competencies are chosen to represent skills that are essential in performing the objectively measured tasks. Hence, the abilities needed to improve performance on the objectively measured tasks are, by design, related to the abilities needed to improve the subjectively assessed competencies.[28] Finally, I assume that performance standards are, on average, similar for the objective and subjective elements.

The Determinants of Centrality Bias and Leniency Bias

As discussed in Section II, I predict that information-gathering costs and strong employee-manager relationships will have positive effects on both centrality and leniency bias. To examine the influence of these factors on centrality bias and leniency bias, I estimate Equations (3) and (4), respectively (see Table 4) using OLS regression analysis with robust standard errors clustered by manager to control for lack of independence between manager evaluations.[29]

The results in Table 4 show that the coefficients on *INFO_C*, the proxy for information-gathering costs, are positive and significant for both centrality bias and leniency bias ($p = 0.06$ for *CEN_BIAS* and $p < 0.01$ for *LEN_BIAS*). This indicates that, consistent with H1a and H1b, managers exhibit more centrality bias and leniency bias when it is more costly for the manager to acquire information on the employee's performance.

The results also show a relationship between performance evaluation biases and the strength of the employee-manager relationship. *NEW_R* is negative and significant for both centrality bias and leniency bias ($p = 0.06$ for *CEN_BIAS* and $p = 0.03$ for *LEN_BIAS*). The results also show a negative coefficient on *DIF_AGE* for leniency bias ($p < 0.01$). Higher values on *DIF_AGE* and *NEW_R* suggest a relatively weak manager-employee relationship. Thus, consistent with H1c and H1d, the evidence indicates that managers give less compressed and less lenient ratings when the employee-manager relationship is weaker. *DIF_AGE* does not show a significant association with

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[27] Another factor that might explain the more lenient ratings in 2003 is that managers were provided more leeway in 2003 since the system was new. My interviews indicate that top management asked the managers to be more rigorous in their use of the compensation system in 2004. Note that managers were not exclusively required to be stricter in rating performance; for example, they also were asked to be more timely with their performance reviews.

[28] Unfortunately, this is not true for the subjective output-based measures; they are not, by design, related to the objective output-based measures. To examine if this drives the results, I re-analyze Equations (1) to (5) for only those observations where all output-based performance measures are objective. The results (untabulated) show that all inferences remain unchanged when this limited set of observations is used.

[29] Variance Inflation Factors (VIF) indicate the absence of multicollinearity problems.

TABLE 4

The Determinants of Managers' Centrality Bias and Leniency Bias

$$CEN\_BIAS_{jt} = \beta_0 + \beta_1 INFO\_C_{jt} + \beta_2 NEW\_R_{jt} + \beta_3 DIF\_AGE_{jt} + \beta_4 DIF\_GEN_j + \beta_5 GROWTH_{jt} + \beta_6 Y_{2003t} + \beta_7 NR\_REF_{jt} + \sum_{k=8}^{11} \beta_k I_{Office_k} + \varepsilon_{jt} \qquad (3)$$

$$LEN\_BIAS_{it} = \beta_0 + \beta_1 INFO\_C_{it} + \beta_2 NEW\_R_{it} + \beta_3 DIF\_AGE_{it} + \beta_4 DIF\_GEN_i + \beta_5 GROWTH_{it} + \beta_6 Y_{2003t} + \sum_{k=7}^{10} \beta_k I_{Office_k} + \varepsilon_{it} \qquad (4)$$

Independent Variables[a]	*CEN_BIAS*	*LEN_BIAS*
INFO_C	0.50*	0.40***
	(1.97)	(5.30)
NEW_R[b]	−1.22*	−0.13**
	(−1.93)	(−2.23)
DIF_AGE[b]	−0.01	−0.01***
	(−0.17)	(−2.87)
DIF_GEN[b]	0.14	0.01
	(0.18)	(0.15)
GROWTH	0.01	0.01
	(1.69)	(1.27)
Y_{2003}	0.30	0.32***
	(1.02)	(4.73)
NR_REF	0.11**	
	(2.20)	
Adj. R^2	0.21	0.17

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*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively. t-values are in parentheses. For the centrality bias analysis j = reference group, t = time, k = offices, and n = 69. For the leniency bias analysis i = employee evaluations, t = time, k = offices, and n = 396.

[a] An intercept and office indicator variables are included but not reported.

[b] In Equation (3), presented in Column (2) *DIF_AGE* is the age difference between the manager and the average age of the reference group; *DIF_GEN* equals 1 if there is a gender difference between the manager and any of the reference group members; and *NEW_R* indicates the percentage of new relationships that exist in the reference group.

Variable Definitions:

CEN_BIAS = centrality bias, measured as the ratio between the standard deviation of the objective ratings of all employees in the reference group, and the standard deviation of the subjective ratings of all employees in the reference group;

LEN_BIAS = leniency bias, measured as the difference between the subjective and the objective performance rating;

INFO_C = indicator variable that equals 1 if the manager does not share a workspace and does not overlap in duties with his subordinates, and 0 otherwise;

NEW_R = indicator variable that equals 1 if the employee or manager joined the company in the last four years, and 0 otherwise;

DIF_AGE = age difference between manager and employee;

DIF_GEN = indicator variable that equals 1 if there is a gender difference between the manager and the employee, and 0 otherwise;

GROWTH = percentage difference between the profit of this year and the profit of last year, calculated per office per year;

Y_{2003} = indicator variable that equals 1 if the observation relates to 2003, and 0 otherwise; and

NR_REF = number of employees in the reference group.

centrality bias, possibly because it is unable to capture the group dynamics that influence the manager's decision to compress ratings.

These results, together with the descriptive statistics, indicate that managers take their personal incentives and preferences into account when rating employee performance. Specifically, managers are lenient when objective ratings are low, and managers provide compressed and lenient ratings when it is costly to collect performance information and when the relationship between the manager and employee is relatively strong.

The results also provide indirect support for the assumptions underlying the centrality bias and leniency bias proxies. Consistent with previous research on centrality bias and leniency bias (Moers 2005), I assume that, on average, ability levels on the objectively measured and subjectively assessed tasks are equal. If the ability levels on the subjective performance elements had been higher, then the positive values on the leniency bias proxy could simply have been a reflection of these higher ability levels. Similarly, centrality bias may be mistaken for truly divergent ability levels on the objectively measured and subjectively assessed elements. However, as there is no reason to expect a strong association between relatively higher (lower variance in) ability levels and, for example, the manager's information-gathering costs, it is unlikely that the leniency (centrality) bias proxy merely reflects differences in ability levels.

The Performance Effects of Centrality Bias and Leniency Bias

As discussed earlier, proxies for centrality bias and leniency bias depend on the validity of the assumption that the objective rating is a good benchmark. However, this assumption is less essential when examining employee reactions. Even if the objective rating is not a good benchmark of actual performance, employees will likely use the objective ratings as a benchmark in comparing their subjective ratings and deriving their perceptions. Thus, because employees react according to their own perceptions, the following analyses are less dependent on the validity of the earlier assumptions.

Recall from Section II that the agency perspective predicts that centrality bias negatively affects performance incentives. The behavioral explanation, on the other hand, predicts that centrality bias positively affects incentives for below-average performers by enhancing employees' perceptions of fairness, while the incentives of above-average performers are negatively affected.[30] Hence, an overall negative relationship between centrality bias and performance would be consistent with the agency perspective, while no effect or a positive effect for below-average performers would be consistent with a behavioral explanation. I estimate Equation (5) (see Table 5) using OLS regression analysis with robust standard errors clustered by manager to control for lack of independence between manager evaluations.

The results presented in Table 5 show, consistent with H2a, that the coefficient on *CEN_BIASA* is negative and significant at the 5 percent level for the change in objective performance ratings (ΔPER_O) and at the 1 percent level for the change in subjective ratings (ΔPER_S) and total performance ratings (ΔPER_T).[31] The results also show that centrality bias (*CEN_BIASB*) negatively influences the performance improvement of below-average performers ($p = 0.06$ for ΔPER_O and $p = 0.01$ for ΔPER_S and ΔPER_T). Consistent with predictions based on the agency perspective, this result indicates that centrality bias has a negative effect on all employees' incentives.

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[30] To analyze the effect of centrality bias for above- and below-average performers separately, I split *CEN_BIAS* into two variables: *CEN_BIASA* and *CEN_BIASB*, where *CEN_BIASA* (*CEN_BIASB*) takes on the value of the ratio when the employee's objective rating is above (below) the average of the reference group, and 0 otherwise.

[31] VIF indicates the absence of multicollinearity problems for all analyses presented in Table 5.

TABLE 5

The Effects of Managers' Performance Evaluation Biases on Employee Performance Improvement

$$\Delta PERF_i = \beta_0 + \beta_1 CEN\_BIASA_i + \beta_2 CEN\_BIASB_i + \beta_3 LEN\_BIAS_i + \beta_4 MAX\_SC_i + \beta_5 PART\_T_i + \beta_6 OLDER_i + \beta_7 DIF\_JOB_i + \beta_8 DIF\_WO_i + \beta_9 DIF\_NR_i + \sum_{k=10}^{13} \beta_k D_{Office_k} + \varepsilon_i \quad (5)$$

Independent Variables[a]	*ΔPERF_O*	*ΔPERF_S*	*ΔPERF_T*
CEN_BIASA	−0.12**	−0.09***	−0.10***
	(−2.12)	(−4.10)	(−3.35)
CEN_BIASB	−0.11*	−0.07***	−0.09***
	(−1.95)	(−2.62)	(−2.67)
LEN_BIAS	0.69***	−0.08	0.26***
	(6.90)	(−1.12)	(3.57)
MAX_SC	−0.23**	−0.02)	−0.12*
	(−2.42)	(−0.23	(−1.87)
PART_T	0.04	0.05	0.04
	(0.43)	(0.69)	(0.48)
OLDER	−0.25	−0.01	−0.12
	(−1.23)	(−0.12)	(−1.01)
DIF_JOB	0.16	0.08	0.13
	(0.85)	(0.92)	(1.32)
DIF_WO	0.01	−0.01	0.01
	(1.38)	(−0.22)	(1.63)
DIF_NR[b]	−0.02	−0.06	−0.02
	(−0.57)	(−1.54)	(−0.67)
Adj. R^2	0.46	0.28	0.42

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*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively. t-values are in parentheses. For all three regressions *i* = employee evaluations, *k* = offices, and n = 198.

[a] An intercept, as well as office indicator variables are included but not reported.

[b] For the regressions with the dependent variable *ΔPERF_O*, *ΔPERF_S*, and *ΔPERF_T*, I use the number of objective, subjective, and total performance measures, respectively, to calculate *DIF_NR*.

Variable Definitions:

ΔPERF_O = difference between the objective performance rating of 2003 and the objective performance rating of 2004;
ΔPERF_S = difference between the subjective performance rating of 2003 and the subjective performance rating of 2004;
ΔPERF_T = difference between the total performance rating of 2003 and the total performance rating of 2004;
CEN_BIASA = variable that equals *CEN_BIAS* if the observation relates to an above-average performer, and 0 otherwise;
CEN_BIASB = variable that equals *CEN_BIAS* if the observation relates to a below-average performer, and 0 otherwise;
LEN_BIAS = leniency bias, measured as the difference between the subjective and the objective performance rating;
MAX_SC = indicator variable that equals 1 if the employee has reached the maximum of his salary scale, and 0 otherwise;
PART_T = indicator variable that equals 1 if the employee works part-time, and 0 otherwise;
OLDER = indicator variable that equals 1 if the employee is older than 50, and 0 otherwise;
DIF_JOB = indicator variable that equals 1 if the employee's job type is different in 2004 compared to 2003, and 0 otherwise;
DIF_WO = difference between the contractual incentive weights on the objective performance measures in 2003 and 2004; and
DIF_NR = difference between the number of performance measures included in 2003 and 2004.

Recall that the predictions for H2c based on the agency perspective and the behavioral perspective are opposing. If I find that leniency bias negatively affects performance improvements, then the agency view is more consistent with the results. However, if I find evidence of no effect or a positive effect, then the results are more consistent with the explanations of behavioral theory. The results in Table 5 show a positive association between leniency bias (*LEN_BIAS*) and performance improvements in the objective and total performance ratings ($p < 0.01$ for ΔPER_O and ΔPER_T).[32] Thus, consistent with the behavioral perspective, I find empirical evidence that employee performance increases with greater leniency bias.

The results, however, show no significant association between leniency bias and performance changes in the subjective performance ratings (ΔPER_S). The less lenient subjective performance ratings in 2004 could possibly explain this insignificant association. Since the subjective performance ratings are biased, a performance change in the subjective ratings could be the result of a change in employee performance and/or a variation in the degree of leniency bias applied by the managers. Accordingly, even if the leniency bias of 2003 had a positive performance effect on the subjective elements, the reduction in leniency bias in 2004 may have prevented me from finding evidence of this positive effect.[33]

Considering the limitations of this analysis, I perform a second analysis based on survey responses that indicate how self-reported employee effort changes after the introduction of the new incentive system. I estimate Equation (6) (provided in Table 6) using an ordered probit regression model with robust standard errors clustered by manager to control for lack of independence between manager evaluations. The results in Table 6 confirm the findings of the previous analysis. That is, I find a negative association between centrality bias (*CEN_BIAS*) and reported effort (*EFFORT*), indicating that the effort improvements are more modest for employees who received compressed ratings. Alternatively, the results show a positive association between leniency bias (*LEN_BIAS*) and reported effort (*EFFORT*), which indicates that the effort improvement is greater for employees who received lenient ratings.

In summary, I find strong support for the prediction that centrality bias and leniency bias affect the capacity of the performance-based compensation system to provide incentives. The results indicate that both the weakening of the link between pay and performance, as predicted by the agency perspective, and the improvement in perceived fairness, as predicted by behavioral theory, play a role in explaining the effect of performance evaluation biases on incentives.

V. CONCLUSION

Rating inaccuracy caused by managers' performance evaluation biases is perceived to be one of the main problems of introducing subjectivity into compensation contracts. This perception is due to the presumed negative effect of such bias on the compensation system's ability to motivate employees and provide valuable information for personnel decisions. However, our knowledge of

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[32] To investigate whether the leniency bias results on $\Delta PERF\_O$ are not simply the result of the objective rating increasing from 2003 to 2004 and the subjective rating staying the same, I perform an additional test. I generate a subsample for which both the objective and the subjective ratings are approximately the same for 2003 and 2004 (I split the sample at the average objective rating in 2003 [2.80] and use the above-average performers). Following, I perform the same analysis (Equation (5)) but only use the subsample. The results (untabulated) show that leniency bias has a significantly positive effect on $\Delta PERF\_O$, which indicates that the findings are not simply the result of the significantly larger improvement in the objective ratings.

[33] Another limitation of this analysis is that the relationship between leniency bias and performance improvements is not free from mechanical positive associations. The 2003 objective and subjective ratings are used to calculate leniency bias and to capture performance improvements. For example, $\Delta PERF\_O$ is defined as OBJ_R_{2004} minus OBJ_R_{2003}, whereas LEN_BIAS is measured as $SUBJ\_R_{2003}$ minus OBJ_R_{2003}. The second analysis examining the performance effects of performance evaluation biases does not suffer from this limitation.

TABLE 6

The Effects of Managers' Performance Evaluation Biases on Employee Effort Improvement

$$EFFORT_i = \beta_0 + \beta_1 CEN\_BIAS_i + \beta_2 LEN\_BIAS_i + \beta_3 MAX\_SC_i + \beta_4 PART\_T_i + \beta_5 OLDER_i + \varepsilon_i \tag{6}$$

Independent Variables[a]	***EFFORT***
CEN_BIAS	−0.49** (−2.28)
LEN_BIAS	0.44*** (2.63)
MAX_SC	−0.97** (−2.14)
PART_T	−0.79* (−1.73)
OLDER	−0.20 (−0.35)
McFadden's Pseudo R^2	0.14

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*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.
Z-values are in parentheses, i = employees, and n = 55.

[a] The intercept is included, but not separately reported.

Variable Definitions:
EFFORT = change in employee effort, measured by using the employee's self-reported change in effort attributed to the new incentive system (measured on a five-point Likert scale);
CEN_BIAS = centrality bias, measured as the ratio between the standard deviation of the objective ratings of all employees in the reference group, and the standard deviation of the subjective ratings of all employees in the reference group;
LEN_BIAS = leniency bias, measured as the difference between the subjective and the objective performance rating;
MAX_SC = indicator variable that equals 1 if the employee has reached the maximum of his salary scale, and 0 otherwise;
PART_T = indicator variable that equals 1 if the employee works part-time, and 0 otherwise; and
OLDER = indicator variable that equals 1 if the employee is older than 50, and 0 otherwise.

the impact of bias on the effectiveness of compensation contracting is limited. Empirical studies examining the consequences of biased performance ratings are especially lacking.

This study contributes to the literature by investigating (1) what causes managers to bias performance ratings, and (2) how biased ratings affect employee incentives. As predicted, the results show that managers respond to their own incentives and preferences when subjectively evaluating performance. Specifically, I find that information gathering and strong employee-manager relationships positively affect centrality bias and leniency bias. The results also show that bias affects not only current performance ratings, but also future employee incentives. Contrary to the predictions based on the agency perspective, I find that managers' performance evaluation biases are not necessarily detrimental to compensation contracting. Although centrality bias negatively affects performance improvement, the evidence does not reveal a significant negative relation between leniency bias and performance. Rather, I find that leniency bias affects performance positively. This is consistent with the behavioral argument that by improving perceived fairness, bias can positively influence incentives.

The finding that managers' performance evaluation biases can have a positive effect on employee incentives provides an explanation for earlier empirical research that shows that managers generally do not receive rewards for rating accurately (e.g., Napier and Latham 1986). Companies appear to be interested in the effectiveness of performance-based compensation contracts in increasing employees' future performance, but not necessarily in the accuracy of the performance ratings (or at least not for incentive purposes). An interesting question for future research would be to examine whether managers foresee the positive incentive effect of leniency bias and act accordingly, or whether leniency bias is merely the result of rating costs. That is, it would be interesting to learn whether the tendency to provide lenient ratings is (partly) strategic or just fortuitous.

Limitations to this study offer additional opportunities for future research. First, although there are no theoretical reasons to expect that the results would not extend to other settings, the ability to generalize the findings is limited by the reliance on data from only one firm. Moreover, I was able to obtain information for only two consecutive years. Consequently, I am unable to examine whether the documented effects of centrality bias and leniency bias persist over time. More extensive time-series data from multiple organizations would address these limitations.

The organization examined in this study is located in The Netherlands. Performance-based compensation systems play a less prominent role in The Netherlands than they do in, for example, the U.S. (Jansen et al. 2009). It would be interesting to examine whether the effects found in this study would be even stronger in countries where performance-based compensation systems play a more dominant role.

Another opportunity for future research would be to examine the effect of managers' performance evaluation biases on other uses of performance ratings. While I limit this study to incentive provision, subjective performance ratings are also likely to impact training and promotion decisions.

Finally, this study focuses only on the effects of biased performance ratings. Subjectivity in compensation contracting is likely to give rise to additional concerns, such as uncertainty about performance criteria (Bol 2008). Investigating how these other concerns, in combination with biased ratings, influence the effectiveness of compensation contracts would make an important contribution to the literature.

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Accounting Adjustments and the Valuation of Financial Statement Note Information in 10-K Filings

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ABSTRACT: We examine the valuation of financial statement note information at the time of 10-K filings. We find that stock returns around 10-K filings are positively related to accounting adjustments calculated from financial statement note information. We further document that the likelihood of equity analysts issuing a report and updating their target price estimates at the 10-K dates is increasing in the magnitude of the adjustments. Those analysts who do update their target prices at this time revise their estimates consistent with the sign and magnitude of the adjustments. These findings are consistent with financial statement users utilizing financial statement note information to make accounting adjustments, thereby incorporating this information into stock prices.

Keywords: *accounting adjustments; financial statement note; 10-K filings; equity analysts; target price estimates.*

JEL Classifications: *G14; G29; M40; M41; M44.*

Data Availability: *All data are publicly available from the sources identified in the article.*

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I. INTRODUCTION

This study examines the equity market's and equity analysts' responses to financial statement note information at the time of 10-K filings. Financial statement note information is an integral part of the financial statements. The note information first becomes available to the public when companies file their 10-K reports. Prior studies examining the information content of 10-K filings document mixed evidence (e.g., Foster and Vickrey 1978; Stice 1991; Easton and Zmijewski 1993; Qi et al. 2000; Griffin 2003; Asthana et al. 2004; Li and Ramesh 2009). However, these studies focus on the market response to the filings of the 10-K reports *per se* and, hence, they are silent regarding to what information the market is reacting. Qi et al. (2000) and You and Zhang (2009) use future profitability to proxy for the content of the 10-K reports, rather than a specific piece or set of information contained in the reports. In contrast, numerous studies have documented the value relevance of individual accounting items disclosed in the notes to the financial statements using a long-window research design (e.g., Bowman 1980; Landsman 1986; Barth et al. 1992; Ely 1995; Aboody et al. 2004; Landsman et al. 2008). In this study, we draw on these two strands of literature to investigate the market reaction to financial statement note information around its release in the 10-K filings and shed light on the mechanism by which note information is incorporated into equity prices.

We conjecture that detailed note information is impounded into stock prices around 10-K filings because it is used by financial statement users to compute accounting adjustments. The idea that financial statement users exploit note information in financial analysis in general and in computing accounting adjustments in particular is not new and some empirical evidence exists that is consistent with this notion (e.g., Foster 1979; Fairfield and Whisenant 2001).[1] A key product of financial statement analysis is accounting adjustments, which are calculated using information disclosed in financial statement notes. For example, note information can be used to capitalize the assets and liabilities associated with operating leases. These adjustments correct missing or misclassified expense and revenue items, and thus make the adjusted income statement numbers more informative as to the economic performance of a company. For this reason, we expect accounting adjustments to be informative and, hence, valued by investors. We test this prediction by examining the valuation of accounting adjustments at the time of 10-K filings, when the note information needed to compute them first becomes publicly available.

To further support our conjecture that note information is incorporated into stock prices because financial statement users employ it to compute accounting adjustments, we also examine the role played by equity analysts in this process. Equity analysts are sophisticated financial statement users, who, we expect, routinely study the financial statements and associated notes of the companies they cover. Under our conjecture, equity analysts use note information to assess and calculate the accounting adjustments needed. When the amount of the adjustments required is different from the analysts' prior expectations, it will affect their assessments of the company's future performance and valuation. Given the new information, analysts revise their target price estimates, thereby impounding financial statement note information into stock prices.

We test this conjecture using a panel of nonfinancial firms, from 2002 to 2007, with adjusted income statement data from Moody's Corporate Financial Metrics (MFM), 10-K filing dates from the Securities and Exchange Commission, and analysts' reports with target price estimates from Investext. We use MFM adjustments to proxy for the amount of accounting adjustments that an average financial statement user would make. MFM employs financial statement note information and additional assumptions to calculate standard adjustments to eight accounting items, as well as nonstandard adjustments to highly judgmental accounts (Jonas 2006). This is one of the first studies to use MFM data in an equity market setting. Recently, Ge et al. (2008) use MFM data to investigate investors' assessment of equity risk attributed to operating leases and find that it is not reflected in stock price for companies not covered by MFM.

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[1] Accounting analysis and adjustments are also discussed ubiquitously in financial reporting and financial statement analysis books. See, e.g., White et al. (2002), Palepu et al. (2004), Koller et al. (2005), Penman (2006), Stickney et al. (2006), Wild et al. (2006), and Revsine et al. (2008). As a specific example, in their discussion of accounting analysis, Palepu et al. (2004, 3–1) state that an "important skill is adjusting a firm's accounting numbers . . . to 'undo' any accounting distortions."

The results of our empirical analysis support our conjecture. First, stock returns around 10-K filings are positively related to the annual changes in accounting adjustments. This result is consistent with equity market participants finding the accounting adjustments and, hence, the note information used to compute them, useful in determining firm value. Second, analysts are more likely to issue reports and revise their target price estimates shortly after the 10-K date for companies that require a large change in accounting adjustments (in either direction). Third, those analysts who do issue reports and update their target prices around the 10-K date revise their target price estimates consistent with the sign and magnitude of the change in accounting adjustments. The last two pieces of evidence lend support for our hypothesized mechanism by which detailed financial statement note information is impounded into security prices.

The interpretation of our results relies on the ability of the MFM adjustments to proxy for the amount of accounting adjustments that a typical financial statement user would make, given note information. There are pros and cons associated with using MFM adjustment data for this purpose. First, MFM makes systematic adjustments to a selected set of accounting issues, allowing them to be applied consistently to a large number of companies. However, the set of MFM adjustments might not be relevant for all companies. Since the methodology used by MFM is conceptually similar to the treatments found in many financial reporting and financial statement analysis books, we believe that MFM adjustments reflect, albeit with error, the actual adjustments made by an average financial statement user. Second, MFM data are available mainly for firms with Moody's rated debt. As a result, our sample is biased toward big companies, making the sample less representative of the population. Nonetheless, the fact that the MFM data are geared toward debt-market participants might be an advantage for us in the sense that our results are less likely attributed to a mechanical relation between our variables of interest (stock returns and equity analysts' actions) and the MFM adjustments.[2] Third, given Moody's debt-market focus, the set of adjustments made by MFM might not be applicable in the equity setting. For example, MFM does not capitalize research and development costs. While we cannot correct for this omission, we focus on MFM's income statement adjustments, because equity market participants are more oriented toward income statement information.[3]

The above discussion suggests that the MFM adjustments measure the actual accounting adjustments with error. The key concern is that the noise in the proxy is somehow systematically correlated with omitted variables in the regressions. If this is the case, then the omitted variables must be related to value-relevant information (in the sense that they affect equity prices) in order for the adjustment proxy to exhibit the documented association with stock returns, analysts' propensity to issue reports and revise their target price estimates, and the direction of analysts' target price revisions. This potential correlated omitted variable problem is mitigated by the use of a short event window, from one day before to five days after the 10-K filing date, in our research design. The short window narrows the possible sources of value-relevant omitted variables. In particular, the adjustment proxy exhibits the expected association with stock return, even after controlling for news in earnings announcements, the tone of the forward-looking statements in the Management Discussion and Analysis section of 10-K filings, analysts' earnings forecast revisions, and analysts' target price revisions that are issued within the 10-K filing window. Hence, our findings are unlikely to be a result of omitted variables that are correlated with value-relevant information from these four sources.

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[2] Given that Moody's is one of the major bond-rating companies, its research is likely to have a direct impact on bond prices and ratings, as shown in Kraft (2010) and Batta et al. (2010). These studies use the MFM data in a debt-market setting.

[3] Our discussion with Moody's staff also indicates that the clients of MFM include equity institutional investors, suggesting that the MFM adjustments appeal to more than debt investors and analysts.

Our study contributes to four strands of literature. First, our results contribute to the 10-K literature. While early studies such as Foster and Vickrey (1978), Stice (1991), and Easton and Zmijewski (1993) find little evidence of a 10-K market reaction, later studies such as Qi et al. (2000), Griffin (2003), and Asthana et al. (2004) document a significant market response to 10-K reports during the EDGAR era. In a larger, more systematic study, Li and Ramesh (2009) find that 10-K reports are informative, but part of the 10-K reaction is attributed to the concurrent releases of earnings in the 10-K filing window. They also show that most of the 10-K reaction is explained by a subset of 10-K filings that coincide with the calendar quarter-end dates, such as March 31 and June 30, in which (1) mutual funds are often trading to window dress their portfolios and (2) other firms are also filing their 10-Ks consistent with an intra-industry information transfer effect. In a related study, Li et al. (2011) show that the market does not react so much to 10-K reports *per se*, but it does react to the subset of such information that is picked up by newswire services. Li and Ramesh (2009) also find no evidence of significant analyst forecast revisions surrounding 10-K filings. With the exception of Li et al. (2011), these studies are silent about the specific information in the 10-K reports that investors are reacting to.

Our study is also related to four other 10-K/10-Q studies. Both Qi et al. (2000) and You and Zhang (2009) document that the 10-K (signed) market reaction is positively related to future profitability, consistent with 10-K reports containing useful information about future performance. Balsam et al. (2002) and Callen et al. (2006) find that the market responds accordingly around the SEC filing dates, because the releases of the full set of financial statements allow investors to estimate discretionary accruals and obtain the accruals-cash flow breakdown, respectively. Our study is similar to the latter two articles in that we identify a specific set of information in the 10-K report, namely notes to the financial statements, and use it to predict *ex ante* how the market would react. Hence, we contribute to this literature by showing that both the stock market and equity analysts react to the accounting adjustments computed based on financial statement note information at the time of 10-K filings.[4]

Second, we add to the value-relevance literature, which shows that financial statement note disclosures are reflected in equity prices (e.g., Bowman 1980; Landsman 1986; Barth et al. 1992; Ely 1995; Aboody et al. 2004; Landsman et al. 2008). In particular, we find evidence consistent with equity analysts using detailed note information to make accounting adjustments, which induce them to revise their target price estimates that, in turn, impact stock prices. By tying the price implication of the note information to a subset of the sophisticated financial statement users, we help rule out the possibility that the results reported in prior studies are partly attributable to spurious correlation. Further, we use a short-window event-study design, thereby mitigating the correlated omitted variables problem, which is a concern for prior studies using a long-window research design (Barth et al. 2001; Holthausen and Watts 2001).[5]

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[4] Recently, Kothari et al. (2009), Li (2010), Brown and Tucker (2011), Feldman et al. (2010), and Miller (2010) have examined the information content in the10-K's MD&A section using textual analysis.

[5] Event studies are more powerful than association tests. Hence, any reactions from analysts and the market that we document are far more likely to come from the 10-K reports, rather than other information correlated with the financial statement adjustment information in the 10-K but issued at times other than the 10-K event window. In addition, as discussed in length earlier, we are also better in identifying and controlling for potential confounding events during the short window to mitigate the potential of correlated omitted variables.

Third, our results provide additional support for the role of analysts as information intermediaries as opposed to information gatherers (Lang and Lundholm 1996). Specifically, our findings are consistent with analysts processing the note information in 10-K reports and transmitting it to the stock market in the form of target price revisions. This is one of the few studies using an event study to examine analysts' use of financial statement note information in their estimates. Fairfield and Whisenant (2001) also show that the Center for Financial Research and Analysis (CFRA) successfully identifies companies with aggressive accounting and poor future performance. CFRA, however, applies its custom analysis on a small set of firms, which tend to have highly unusual activities or very aggressive accounting for a specific accounting item. In contrast, our study uses MFM data, which cover a larger sample of firms, thereby helping to generalize the notion that the analysis of financial statements is informative. Specifically, the CFRA sample has 373 firms and observations. Our final MFM sample includes 958 firms and 4,944 firm-year observations.

Fourth, we supplement prior studies examining other types of adjusted earnings, such as pro forma earnings (e.g., Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Lundholm et al. 2003) and economic value added (e.g., Biddle et al. 1997). Pro forma earnings are GAAP earnings excluding certain costs that the company deems to be transitory in nature, such as one-time losses, asset write-downs, and restructuring charges. MFM adjustments include not only these types of adjustments, but also adjustments to other items and, hence, they are broader than pro forma earnings. While the MFM adjustments are systematically applied, pro forma earnings are less comparable across companies, because the latter are prepared by the companies themselves.[6] Economic Value Added (EVA®) is residual income computed using accounting numbers adjusted by Stern Stewart & Co. Biddle et al. (1997) find that the accounting adjustment component of EVA has an insignificant association with market-adjusted returns, suggesting that EVA accounting adjustments are of little value. While there is some overlap in the adjustments made by Stern Stewart & Co. and Moody's MFM, such as how operating leases are handled, Stern Stewart's adjustments are not identical to MFM and it does not apply the same set of adjustments systematically to all companies. Our study also differs from this literature in that we conduct our tests using a short-window event-study design. We also investigate the actions of equity analysts in the incorporation of financial statement note information into stock price.

The next section describes our data and provides summary statistics on Moody's adjustments. Section III investigates the market response to accounting adjustments around the release of financial statements at 10-K filing dates. Section IV examines the role of equity analysts in the incorporation of the accounting adjustments and, hence, financial statement note information into stock prices. Section V concludes.

II. DATA

Sample Selection

The initial sample includes all companies in Moody's Corporate Financial Metrics (MFM) database, which is our source of the adjusted financial statement data. We download all annual financial statement data, including GAAP reported and MFM adjusted balance sheets and income statements, for the time period from 2002 until 2007 for U.S. nonfinancial companies. This process results in 8,327 firm-year observations for 1,564 U.S. firms. We match the MFM data with the CRSP-

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[6] The SEC finds pro forma earnings potentially misleading if not properly disclosed. In January 2003, the SEC enacted Regulation G that became effective March 28, 2003 and regulates companies' presentation of pro forma earnings, including the requirement that companies reconcile pro forma numbers to GAAP earnings.

Compustat merged database (CCM) at the firm level by equity ticker symbol and firm name. We hand-collect target price estimates from analysts' reports downloaded from Investext, matching our sample firms to Investext by name and ticker symbol. Our requirement of stock returns limits the analysis to firms with publicly traded equity. By using some financial statement data from CCM, we avoid losing one year of sample observations. For example, in certain tests we use lagged assets as a deflator. After this step, our sample contains 4,944 firm-year observations for 958 U.S. firms.

Our empirical tests focus on a short window from one day before to five days after the 10-K filing date. We obtain the filing dates from the Securities and Exchange Commission. While it is possible that Moody's analysts have obtained 10-K information privately before the 10-K is publicly filed, MFM does not publicly issue their adjusted data for at least seven to ten business days following the 10-K filing date. Hence, for our tests that focus on the 10-K event window, equity analysts and other market participants have access to 10-K information but do not have access to MFM adjusted numbers, thereby ruling out the possibility that market participants and equity analysts are responding to the release of MFM data.

Accounting Adjustment Data

Our source of accounting adjustment data is Moody's Corporate Financial Metrics (MFM) database.[7] MFM systematically adjusts the financial statements of nonfinancial corporations to improve consistency in its rating practice among analysts. The adjustments are reviewed and approved by MFM's team of analysts and accounting specialists. Appendix A, as well as Jonas (2006), provides a detailed description of these adjustments and the underlying methodology.

MFM systematically makes standard adjustments, if applicable, to underfunded defined benefit pensions, operating leases, capitalized interest, employee stock compensation, hybrid securities, securitizations, unusual and non-recurring items, and inventory on a LIFO cost basis. Underfunded defined benefit pensions, operating leases, hybrid securities, and securitizations lead to understated liabilities. MFM adds these debt-like liabilities to the balance sheet and corrects the classification of related expenses on the income statement. Adjustments for capitalized interest and employee stock compensation add missing interest expense and compensation expense, respectively, back to the income statement. Adjustments for unusual and non-recurring items include moving transitory components to below net income before unusual items. MFM also makes nonstandard adjustments to other accounts to make the financial statements more reflective of the company's underlying economics. These involve judgmental items such as asset valuation allowances, impairments of assets, and contingent liabilities. Table 1 summarizes each of these adjustments and their effects on the income statement.

We expect that these adjustments correct missing or misclassified expense and revenue items on the income statement, making the adjusted earnings subtotal numbers more useful. In particular, adjusted earnings before interest and taxes (EBIT) better reflects the operating performance of the company, while the adjusted items between EBIT and net income before unusual items better reflect the financing and tax strategies of the company. Finally, the adjusted items below net income before unusual items should better reflect the transitory component of earnings.[8]

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[7] Other studies using the MFM database include Ge et al. (2008), Kraft (2010), and Batta et al. (2010). While there are some other data providers of accounting adjustments, such as Capital IQ and Bloomberg, their adjustment data suffer a number of limitations. For example, Capital IQ, which has more adjustment information than Bloomberg, does not have any adjustment information on pensions, capitalized interests, hybrids, and makes no nonstandard adjustments like Moody's does. In addition, when Capital IQ provides some adjustment information, for example on operating leases, Capital IQ fails to fully articulate how this adjustment information affects the complete set of financial statements, like Moody's does.

[8] Financial statement analysis and adjustments also have the potential to improve accounting comparability across companies. In this study, we do not examine the effects of adjustments on comparability, using for example measures as in De Franco et al. (2011).

TABLE 1

The Effect of Six Moody's Standard Adjustments on Income Statement Line Items

Panel A: Underfunded Defined Benefit Pensions, Operating Leases, and Hybrid Securities

	Underfunded Defined Benefit Pensions	**Operating Leases**	**Hybrid Securities**
Cost of Goods Sold/SG&A Expenses/Operating Expenses	Increases proportionally by service cost minus GAAP pension costs.	Decreases proportionally by interest component of rent expense.	No effect
Depreciation	No effect	Increases by depreciation component of rent expense.	No effect
Other Income/(Other Expense)	No effect	No effect	No effect
Adjusted EBIT	**Increases or Decreases**	**Increases**	**No effect**
Interest Expense	Increases by interest cost on the PBO.	Increases by interest component of rent expense.	Increases by interest expense for debt portion of hybrid securities classified as pure equity or minority interest. Decreases by preferred dividends for equity portion of hybrid securities classified as pure debt.
Other Loss or Expense (Gain or Income)	Increases by actual losses on pension assets. Decreases by actual gains on pension assets up to amount of interest cost.	No effect	Decreases by interest expense for debt portion of hybrid securities classified as pure equity. Increases by preferred dividends for equity portion of hybrid securities classified as pure debt or minority interest.
Taxes Expense	Decreases by tax effect of additional pension costs.	No effect	No effect
Adjusted Net Income After-Tax Before Unusual Items	**Increases or Decreases**	**No effect**	**No effect**
Moody's Unusual & Non-Recurring Items—Adjustments After-Tax	Decreases by after-tax effect of additional pension costs.	No effect	No effect
GAAP Net Income	**No effect**	**No effect**	**No effect**

(continued on next page)

TABLE 1 (continued)

Panel B: Securitizations, Capitalized Interest, and Employee Stock Compensation

	Securitizations	**Capitalized Interest**	**Employee Stock Compensation**
Cost of Goods Sold/SG&A Expenses/Operating Expenses	No effect	No effect	SG&A increases by amount of pre-tax ESO expense.
Depreciation	No effect	No effect	No effect
Other Income/(Other Expense)	Decreases by imputed interest on amount of additional collateralized borrowings.	No effect	No effect
Adjusted EBIT	**Increases or no effect**	**No effect**	**Decreases**
Interest Expense	Increases by imputed interest on amount of additional collateralized borrowings.	Increases by amount of capitalized interest during current period.	No effect
Other Loss or Expense (Gain or Income)	No effect	No effect	No effect
Taxes Expense	No effect	Decreases by tax effect of additional interest expense.	Decreases by tax effect of additional ESO expense.
Adjusted Net Income After-Tax Before Unusual Items	**No effect**	**Decreases**	**Decreases**
Moody's Unusual & Non-Recurring Items—Adjustments After-Tax	No effect	Decreases by after-tax effect of additional interest expense.	Decreases by after-tax effect of additional ESO expense.
GAAP Net Income	**No effect**	**No effect**	**No effect**

This table summarizes the effect of six Moody's standard adjustments on the income statement. Panel A describes the first three adjustments and Panel B describes the next three adjustments. Two other adjustments, Unusual & Non-Recurring Items and Non-Standard Adjustments, do not follow a standard form and can affect any account. See the text and Appendix A for a detailed discussion of these adjustments.

Table 2, Panel A provides descriptive statistics about the effect of each adjustment on net income before unusual items. Consider adjustments to underfunded defined benefit pensions. The mean adjustment for all firm-year observations is −0.22 percent of (lagged total) assets, consistent with the frequency and magnitude of negative adjustments outweighing that of positive adjustments. Negative income adjustments occur for 47 percent of observations, while 21 percent of adjustments affect income positively. For the 5 percent of observations with the most negative adjustments, income is adjusted downward by 1.35 percent or more of assets. In contrast, the 95th percentile of adjustments is 0.17 percent of assets.

The standard deviation column indicates that some adjustments vary considerably more than others. Most of the variation in the total adjustments, the sum of the individual adjustments, is driven by variation in unusual and non-recurring items, followed by nonstandard adjustments, stock compensation, and underfunded pensions. The mean total adjustment to income is −0.05 percent of assets, consistent with most total adjustments being negative (i.e., 68 percent of observations).

Table 2, Panel B provides the same descriptive statistics for the effect of each adjustment on EBIT. The prevalence of positive adjustments to EBIT is much higher than the corresponding adjustments to net income before unusual items reported in Panel A. For example, the mean Total adjustment is 1.05 percent of assets, compared with that of −0.05 percent on net income before unusual items. Of the total adjustments, 66.5 percent result in an increase to EBIT, compared to only 30.5 percent of adjustments (from Panel A) leading to an increase in net income before unusual items. This pattern is consistent with many of the adjustments decreasing expenses before interest and taxes (hence, EBIT increases) and increasing expenses below EBIT (hence, net income before unusual items decreases).

III. STOCK MARKET REACTION AROUND 10-K FILINGS

We investigate the stock market reaction to the accounting adjustments around the release of the 10-K reports to test the market valuation of the financial statement note information. The 10-K filing event is critical because the information needed to calculate the adjustments (e.g., the interest on the projected benefit obligation, actual gains or losses on pension assets, the interest and depreciation components of operating lease expense, the amount of capitalized interest, or employee stock option costs) is included in the notes to financial statements filed with the 10-K report and is typically not available before that time. We test whether the adjustments are associated with the market reaction around the 10-K filing using the following regression equations:

$$CAR_{it} = \beta_0 + \beta_1 \Delta AdjNI_{it} + \beta_2 AdjUNUSUAL_{it} + \beta_3 LagAdjUNUSUAL_{it} + \beta_4 EarnSurprise_{it} + \beta_5 Book\text{-}Market_{it} + \beta_6 Size_{it} + \varepsilon. \quad (1)$$

$$CAR_{it} = \beta_0 + \beta_1 \Delta AdjEBIT_{it} + \beta_2 \Delta AdjOTH_{it} + \beta_3 AdjUNUSUAL_{it} + \beta_4 LagAdjUNUSUAL_{it} + \beta_5 EarnSurprise_{it} + \beta_6 Book\text{-}Market_{it} + \beta_7 Size_{it} + \varepsilon. \quad (2)$$

CAR_{it} is the cumulative abnormal return obtained from CRSP from one day before to five days after the year t 10-K filing date. Abnormal returns are computed as firm raw returns less the CRSP size-matched decile index returns. The 10-K filing date is obtained directly from the SEC's EDGAR website.

$\Delta AdjNI$ is Moody's adjustments to firm i's net income before unusual items for year t less Moody's adjustments for year $t-1$, scaled by lagged total assets. By subtracting last year's adjustments, we are implicitly using last year's adjustments as analysts' expected amount. The

TABLE 2

Descriptive Statistics on Moody's Accounting Adjustments

Panel A: Adjustments to Net Income before Unusual Items (Percent of Lagged Total Assets)

						Percentiles		
	Mean	**Std. Dev.**	**% < 0**	**% = 0**	**% > 0**	**5%**	**50%**	**95%**
Underfunded defined benefit pensions	−0.22%	0.97%	47.3%	32.2%	20.5%	−1.35%	0.00%	0.17%
Operating leases	0.00%	0.00%	0.0%	100.0%	0.0%	0.00%	0.00%	0.00%
Hybrid securities	0.00%	0.00%	0.0%	100.0%	0.0%	0.00%	0.00%	0.00%
Securitizations	0.00%	0.00%	0.0%	100.0%	0.0%	0.00%	0.00%	0.00%
Capitalized interest	−0.04%	0.21%	25.3%	74.7%	0.0%	−0.24%	0.00%	0.00%
Employee stock compensation	−0.30%	1.00%	42.5%	56.7%	0.8%	−1.42%	0.00%	0.00%
Unusual and non-recurring items	0.49%	3.48%	18.9%	54.6%	26.5%	−0.46%	0.00%	2.86%
Non-standard adjustment	0.03%	2.56%	10.1%	86.7%	3.3%	0.00%	0.00%	0.00%
Total adjustment	−0.05%	4.49%	67.9%	1.6%	30.5%	−2.79%	−0.13%	2.51%

Panel B: Adjustments to EBIT (Percent of Lagged Total Assets)

						Percentiles		
	Mean	**Std. Dev.**	**% < 0**	**% = 0**	**% > 0**	**5%**	**50%**	**95%**
Underfunded defined benefit pensions	0.04%	0.53%	28.0%	32.8%	39.2%	−0.53%	0.00%	0.61%
Operating leases	0.71%	1.15%	7.1%	1.8%	91.1%	0.04%	0.36%	2.66%
Hybrid securities	0.00%	0.01%	7.1%	92.6%	0.3%	0.00%	0.00%	0.00%
Securitizations	0.02%	0.12%	7.1%	86.2%	6.7%	0.00%	0.00%	0.05%
Capitalized interest	0.00%	0.00%	7.1%	92.9%	0.0%	0.00%	0.00%	0.00%
Employee stock compensation	−0.44%	1.39%	42.5%	56.7%	0.8%	−2.06%	0.00%	0.00%
Unusual and non-recurring items	0.69%	4.32%	19.7%	51.8%	28.4%	−0.81%	0.00%	4.35%
Non-standard adjustment	0.04%	1.60%	12.6%	80.6%	6.8%	−0.09%	0.00%	0.16%
Total adjustment	1.05%	4.74%	33.0%	0.5%	65.5%	−2.25%	0.40%	6.66%

This table provides descriptive statistics about our sample of 4,944 firm-year observations for a panel of 958 U.S. firms, covering the period 2002 through 2007. Panels A and B report summary statistics on the effect of eight adjustments to net income before unusual items and earnings before interest and taxes (EBIT), respectively, scaled by beginning total assets. Moody's also adjusts LIFO inventory balance using the FIFO cost assumption, but makes no adjustment to the income statement.

coarseness of, and hence the noise in, our measure of expectations should weaken the power of our tests.[9] The second equation decomposes the net income (before unusual items) adjustments into those that affect EBIT and those that affect the difference between EBIT and net income (before unusual items). $\Delta AdjEBIT$ is Moody's adjustments to firm i's EBIT for year t less Moody's adjustments for year $t-1$, scaled by beginning total assets, and $\Delta AdjOTH$ is $\Delta AdjNI$ less $\Delta AdjEBIT$.

We exclude the adjustments to unusual and non-recurring items from the calculation of adjustments to net income (or its components) because they are different from other adjustments in nature. By definition, unusual and non-recurring items are not expected to persist in the future, so we do not use last year's amounts as an expectation. Instead, we add the adjustments to unusual and non-recurring items to the specification as a separate variable *AdjUNUSUAL*, which is Moody's unusual and non-recurring adjustments to firm *i*'s net income for year *t*. The predicted sign and magnitude on the estimated coefficient of *AdjUNUSUAL* are less clear. If they are totally unexpected at 10-K filing, then we predict the coefficient on *AdjUNUSUAL* to be positive, but smaller compared to those on *ΔAdjEBIT* or *ΔAdjNI*, which we do expect to persist. However, these items are likely expected at 10-K filings, because companies usually disclose them at earnings announcements. If the 10-K filing contains no incremental information on these items over what has already been disclosed at earnings releases, then the estimated coefficient on *AdjUNUSUAL* will be 0. However, if the 10-K filing provides more detailed information on the nature and magnitude of these unusual items, then the estimated coefficient on *AdjUNUSUAL* could be positive or negative. Furthermore, prior research shows that unusual and non-recurring adjustments items do persist, at least in part (e.g., Elliott and Hanna 1996; Burgstahler et al. 2002). If so, the contemporaneous value in levels may contain significant noise. To help alleviate any possible noise, we include the previous year's value *LagAdjUNUSUAL* in the model. If there is persistence in these adjustments, then we would expect this variable to load in a direction opposite to the coefficient on its contemporaneous counterpart, *AdjUNUSUAL*.

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[9] In subsequent sensitivity analysis, we control for the possibility that some of this information has already appeared in 10-Q reports.

Using earnings announcement dates from I/B/E/S, we find that about 11 percent of our observations for this test have earnings released within the 10-K filing window. To control for the confounding effect of the earnings announcement, we include in the model the variable *EarnSurprise*, which equals firm *i*'s earnings surprise if earnings is announced inside the 10-K filing window, and 0 otherwise. We compute earnings surprise as actual earnings per share (EPS) for period *t* minus the mean of analysts' EPS forecast, scaled by stock price measured at the end of year *t*−1. Other firm controls include *Book-Market*, measured as the ratio of the book value of equity to the market value of equity for year *t*, and *Size*, measured as the logarithm of the market value of equity for year *t*. We also control for year fixed effects and cluster the standard errors at the firm level. Table 3 provides definitions for all variables used in all tests.

Table 4, Panel A presents descriptive statistics for the variables used in these tests. The sample consists of 3,069 firm-year observations, which is smaller than that used in Table 2 because of the data requirement for the explanatory variables. The mean seven-day cumulative abnormal return (*CAR*) from one day before to five days after the 10-K filing is 0.2 percent, with a standard deviation of 4.4 percent. The average change in the adjustment to net income before unusual items is 0.3 percent of lagged total assets. The book-to-market ratio of the average firm is 0.436.

Table 4, Panel B summarizes the estimation of Equations (1) and (2). Column (1) shows that the estimated coefficient on *ΔAdjNI* is 0.075 and statistically different from zero, suggesting that positive adjustments to net income are associated with positive stock returns around the 10-K filings. (Significance levels are based on one-tailed tests where there is a prediction for the sign of the coefficient and based on two-tailed tests otherwise for all tests in this study.) Similarly, Column (2) finds that the estimated coefficients on *ΔAdjEBIT* and *ΔAdjOTH*, the two components of *ΔAdjNI*, are 0.096 and 0.060, respectively. Although, the former coefficient is greater than the latter coefficient, untabulated tests indicate this difference is not significant. Furthermore, *AdjUNUSUAL* exhibits a statistically negative association with stock return around the 10-K filing date. The negative coefficient can be attributed to investors overestimating the persistence of *AdjUNUSUAL* before the 10-K reports are released and revising their estimates downward once they read the notes to the financial statements, which provide more information about the nature of these items. Taken together, these results are consistent with stock market participants using 10-K note information to analyze accounting issues and to compute appropriate adjustments to the financial statements. As a

TABLE 3

Definitions of Variables Used in Tests

$\Delta AdjEBIT$ = Moody's adjustments to firm i's EBIT for year t less Moody's adjustments for year $t-1$, scaled by beginning total assets;

$\Delta AdjEBIT3Q$ = Moody's adjustments to firm i's EBIT for the first three quarters of year t less Moody's adjustments for the first three quarters of year $t-1$, scaled by beginning total assets;

$\Delta AdjNI$ = Moody's adjustments to firm i's net income before unusual items for year t less Moody's adjustments for year $t-1$, scaled by lagged total assets;

$\Delta AdjNI3Q$ = Moody's adjustments to firm i's net income before unusual items for the first three quarters of year t less Moody's adjustments for the first three quarters of year $t-1$, scaled by lagged total assets;

$\Delta AdjOTH$ = $\Delta AdjNI$ less $\Delta AdjEBIT$;

$\Delta AdjOTH3Q$ = $\Delta AdjNI3Q$ less $\Delta AdjEBIT3Q$;

$AdjUNUSUAL$ = Moody's unusual and non-recurring adjustments to firm i's net income for year t;

$\Delta Adj3Q\_IND$ = indicator variable that equals 1 if Moody's provides quarterly adjusted income statement for the first three quarters of year t and year $t-1$, 0 otherwise;

Book-Market = ratio of the book value of equity to the market value of equity for year t;

CAR = cumulative abnormal returns from one day before to five days after the *year*-1 10-K filing date, where abnormal returns is computed as firm i's raw returns less the CRSP size-matched decile index returns;

EarnFcstRev = analyst j's forecast of year $t+1$ earnings issued one day before to five days after the year t 10-K filing date minus analyst j's prior forecast of corresponding earnings, scaled by the standard deviation of all forecasts made within 180 days before the 10-K filing date. For the Table 7 tests, a firm-year measure of this variable is created by taking the firm-year mean of the analyst-firm-year values if there is more than one value, and equal to 0 if there is no value;

EarnSurprise = firm i's earnings surprise if earnings is announced inside the 10-K filing window, and 0 otherwise. Earnings surprise is the actual earnings per share (EPS) for year t minus mean analysts' forecast of EPS, scaled by stock price measured at the end of year $t-1$. For the Table 4 and Table 7 tests, a firm-year measure of this variable is created by taking the firm-year mean of the analyst-firm-year values if there is more than one value, and equal to 0 if there is no value;

Inverse Mills' Ratio = value computed using the corresponding estimates from Equations (3) and (4), as reported in Table 5;

LagAdjUNUSUAL = *AdjUNUSUAL* for year $t-1$;

MD&A Tone = tone of forward-looking statements in the Management Discussion and Analysis section of 10-K filings measured using a Naïve Bayesian machine learning algorithm as in Li (2010);

Size = logarithm of the market value of equity for year t;

TgtPriceRevInd = indicator variable that equals 1 if analyst j issues a report that contains a target price revision for firm i one day before to five days after the *year*-1 10-K filing date, 0 otherwise;

TgtPriceRev = analyst j's target price forecast for firm i issued one day before to five days after the year t 10-K filing date minus analyst j's prior target price forecast for firm i, scaled by the prior target price forecast. For the Table 7 tests, a firm-year measure of this variable is created by taking the firm-year mean of the analyst-firm-year values if there is more than one value, and equal to 0 if there is no value; and

$|\bullet|$ = absolute value of the variable.

result, the detailed note information is incorporated into stock price because it is being used by financial statement users to compute accounting adjustments.

Some of the note information needed to analyze the accounting issues or make adjustments appears in the 10-Q quarterly reports, and equity market participants can potentially take advantage of these interim data to extrapolate the annual figures. As a result, the market's expectation of the adjustments for the current year will not be based solely on last year's numbers, such that we will measure unexpected adjustments with error. To allow for such a possibility, we add to the regressions the corresponding changes in the adjustment terms cumulated over the first three quarters of the year, $\Delta Adj3Q\_IND$, $\Delta AdjNI3Q$, $\Delta AdjEBIT3Q$, and $\Delta AdjOTH3Q$. Columns (3) and (4) show that, even after allowing for the update of market's expectation using quarterly note information, the results on all the annual adjustment terms are similar to those reported in columns (1) and (2) and, hence, corroborate our original inferences. In particular, the market values $\Delta AdjNI$, $\Delta AdjEBIT$, and $\Delta AdjOTH$ positively, but does not appear to value the quarterly update terms.

As a robustness test, we also control for the information content of the forward-looking statements in the Management Discussion and Analysis section (MD&A) of 10-K filings. To the extent that the tone of the MD&A reflects other news issued at the time of the 10-K filing, its inclusion will mitigate the concern that other information correlated with our financial statement note variables is actually driving our results. *MD&A Tone* is measured using a Naïve Bayesian machine learning algorithm as in Li (2010), the details of which are provided in that study.[10] The sample for these tests is smaller because this measure was not available for all our observations. The test results are presented in columns (5) and (6). The tone of the MD&A is positively related to the stock market reaction. Our inferences about note information being impounded into stock prices at the time of the 10-K filing remain unchanged.

As another robustness test, in untabulated analysis, we estimate our results excluding observations in which the earnings announcements fall inside our 10-K filing event window. It is possible that information about the adjustments, such as unusual items or pensions, released at the time of the earnings surprise could be affecting our results. The inferences from this test are qualitatively similar to those we tabulate.[11]

Taken together, the findings reported in Table 4 are consistent with financial statement users employing the 10-K note information to analyze accounting issues and make accounting adjustments, thereby impounding the note information into stock prices. These results add to the literature on the information content of 10-K filings by showing that notes to the financial statements, a subset of the information in the 10-K report, are informative. Further, these results add to the value-relevance literature by showing that note disclosures are also priced in a short window around their releases.

IV. ANALYSTS' TARGET PRICE REVISIONS AROUND 10-K FILINGS

The results from the previous section are consistent with the accounting adjustments and the corresponding financial statement note information being informative. In this section, we examine a

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[10] We thank Feng Li for providing the *MD&A Tone* data.

[11] More specifically, in this robustness test, the coefficients on the $\Delta AdjNI$ and $\Delta AdjOTH$ variables are statistically significant in the expected directions, while the coefficient on $\Delta AdjEBIT$ is not significant. We perform similar robustness tests, excluding observations in which the earnings announcements fall in the 10-K event window, for the analyses reported in Tables 5 to 7. Although the results are weaker (and in some cases, the adjustment variables are no longer significant), overall they continue to provide evidence that supports our inferences. Because of the weaker results, we cannot rule out the notion that information about the adjustments, such as unusual items or pensions, released at the time of the earnings announcements drive, at least in part, the tabulated results. These findings, however, would still be consistent with our claim that analysts use information in notes—the difference being that this information is obtained at the time of the earnings announcement concurrent with the 10-K filing as opposed to directly and exclusively acquiring this information from the 10-K filing.

TABLE 4

Stock Market Response to Accounting Adjustments around 10-K Filings

Panel A: Descriptive Statistics

				Percentile		
Variable	**No. of Obs.**	**Mean**	**Std. Dev.**	**5%**	**50%**	**95%**
CAR	3,069	0.002	0.044	−0.058	0.001	0.066
ΔAdjNI	3,069	0.003	0.052	−0.005	0.000	0.019
ΔAdjEBIT	3,069	0.001	0.039	−0.008	0.001	0.015
ΔAdjOTH	3,069	0.001	0.045	−0.008	−0.000	0.018
AdjUNUSUAL	3,069	0.004	0.027	−0.005	0.000	0.024
EarnSurprise	3,069	0.000	0.019	−0.006	0.000	0.007
Book-Market	3,069	0.436	0.401	0.060	0.415	0.939
Size	3,069	8.242	1.426	6.138	8.102	10.788

Panel B: Multivariate Analysis

Explanatory Variable	**Pred. Sign**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ΔAdjNI	+	0.075		0.076		0.085	
		(3.44)***		(3.49)***		(2.92)***	
ΔAdjEBIT	+		0.096		0.098		0.102
			(3.57)***		(3.77)***		(4.46)***
ΔAdjOTH	+		0.060		0.061		0.055
			(4.87)***		(4.86)***		(1.87)**
AdjUNUSUAL	?	−0.127	−0.127	−0.127	−0.127	−0.071	−0.072
		(−2.88)***	(−2.89)***	(−2.88)***	(−2.89)***	(−1.34)	(−1.35)
LagAdjUNUSUAL	?	0.014	0.013	0.014	0.014	−0.026	−0.026
		(0.45)	(0.44)	(0.47)	(0.45)	(−0.74)	(−0.72)
EarnSurprise	+	0.369	0.372	0.368	0.369	0.412	0.412
		(2.67)***	(2.69)***	(2.65)***	(2.64)***	(2.62)***	(2.60)***
Book-Market	?	0.002	0.002	0.002	0.002	0.010	0.010
		(0.46)	(0.45)	(0.44)	(0.43)	(1.91)*	(1.90)*
Size	?	−0.001	−0.001	−0.001	−0.001	−0.000	−0.000
		(−1.51)	(−1.53)	(−1.57)	(−1.58)	(−0.41)	(−0.39)
ΔAdj3Q_IND	?			0.003	0.003	0.003	0.003
				(1.01)	(0.99)	(0.95)	(0.96)
ΔAdjNI3Q	?			−0.136		−0.178	
				(−1.45)		(−1.39)	
ΔAdjEBIT3Q	?				−0.138		−0.159
					(−1.34)		(−1.18)
ΔAdjOTH3Q	?				−0.114		−0.089
					(−0.58)		(−0.35)
MD&A Tone	+					0.015	0.015
						(2.46)***	(2.47)***

(continued on next page)

TABLE 4 (continued)

Explanatory Variable	Pred. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.		3,069	3,069	3,069	3,069	1,786	1,786
Adj. R^2 (%)		2.1	2.2	2.2	2.3	3.4	3.6

*, **, *** Denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.
Coefficient t-statistics are in parentheses. Significance levels are based on one-tailed tests where there is a prediction for the sign of the coefficient and based on two-tailed tests otherwise.
This table examines the effect of accounting adjustments on stock returns around the 10-K filing window. Panel A reports summary statistics on firm-year-level data. Panel B presents the multivariate test results. We regress event-window cumulative abnormal stock returns (*CAR*) on annual changes in adjustments to net income and its components, plus controls. Intercept and year fixed effects are included for each model but not tabulated. We estimate each model as a panel and cluster the standard errors at the firm level. See Table 3 for variable definitions.

potential mechanism by which this note information is incorporated into stock prices. By doing so, we hope to better understand the underlying link between note information and stock prices and to rule out the possibility that the documented market reaction results are spurious. Specifically, we investigate the actions taken by equity analysts in responding to the release of note information in 10-K filings. Equity analysts are known to scrutinize the financial statements and the associated notes of the companies they follow. If analysts use note information to compute the necessary accounting adjustments, then any news in accounting adjustments will change analysts' assessments of the company being analyzed.[12]

First, we examine whether analysts are more likely to revise their target price estimates for companies that require a large unexpected accounting adjustment to their GAAP earnings. Second, we test whether the direction of the target price revision is proportional to the direction of the unexpected accounting adjustment, conditional on analysts issuing reports with target price revision information. Unlike the tests in Section III, which are conducted using firm-year data, the tests in this section are conducted at the analyst-firm-year level.

We use target price as our main variable of interest because it represents the sum of the discounted future cash flows and, hence, it gives us a comprehensive measure of the importance of the adjustment information. Accounting adjustments are meant to generate a better measure of economic earnings, and they have implications for both short-term and long-term expected cash flows. For example, an unexpectedly higher employee stock compensation adjustment (in the pre-SFAS 123R period) can be due to an increase in the usage of stock-based compensation, which will have an immediate effect on analysts' forecasts of near-term cash flows, and could, via its incentive effect, have an incremental effect on long-term expected cash flows. Revisions to target price reflect the changes in the sum of the discounted expected future cash flows and, hence, they provide the desired measures that capture the effect of the accounting adjustments on both short- and long-term cash flows. Bradshaw (2002) and Brav and Lehavy (2003) document evidence consistent with target price estimates being informative.[13]

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[12] For example, retail-industry analysts often capitalize operating leases (e.g., Lejuez et al. 2006). Some large brokerage firms have separate analysts who engage exclusively in accounting analysis. These analysts often monitor the views and regulations of the SEC or the FASB (e.g., Zion and Carcache 2005) or focus on specific accounting issues as they become more topical about a large cross-section of companies (e.g., Levinson 2008).

[13] An alternative is to use analysts' earnings forecasts. While earnings forecasts are more widely available than target price estimates, the former reflect only changes in near-term GAAP-based earnings expectations. By their nature, many accounting adjustments should not affect analysts' assessment of future GAAP earnings.

Analysts' Decision to Issue Reports with Target Price Revisions around 10-K Filings

We first test whether analysts are more likely to issue reports with target price revisions shortly after the release of the 10-K reports if the magnitude of the unexpected adjustments is larger. If analysts use note information to conduct accounting adjustments, then we expect the likelihood of analysts revising their target price estimates to increase with the absolute magnitude of the unexpected adjustment. We test this prediction using the following logistic models:

$$
\begin{aligned}
&Prob(TgtPriceRevInd_{itj} = 1)\\
&\quad = \beta_0 + \beta_1|\Delta AdjNI_{it}| + \beta_2\, AdjUNUSUAL_{it}| + \beta_3|LagAdjUNUSUAL_{it}| + \beta_4|EarnSurprise_{itj}|\\
&\qquad + \beta_5 Book\text{-}Market_{it} + \beta_6 Size_{it} + \varepsilon. \qquad (3)
\end{aligned}
$$

$$
\begin{aligned}
&Prob(TgtPriceRevInd_{itj} = 1)\\
&\quad = \beta_0 + \beta_1|\Delta AdjEBIT_{it}| + \beta_2|\Delta AdjOTH_{it}| + \beta_3|AdjUNUSUAL_{it}| + \beta_4|LagAdjUNUSUAL_{it}|\\
&\qquad + \beta_5|EarnSurprise_{itj}| + \beta_6 Book\text{-}Market_{it} + \beta_7 Size_{it} + \varepsilon. \qquad (4)
\end{aligned}
$$

$TgtPriceRevInd_{itj}$ is an indicator variable that equals 1 if analyst *j* issues a report that contains a target price revision for firm *i* one day before to five days after the year *t* 10-K filing date, and 0 otherwise. The explanatory variables are defined in Section III, under Equation (2). We take the absolute value of adjustment variables (i.e., *ΔAdjNI*, *ΔAdjEBIT*, *ΔAdjOTH*, *AdjUNUSUAL*, and *LagAdjUNUSUAL*) because we predict that larger adjustment changes in either direction will cause analysts to issue reports and update their target prices. Different from the firm-level market reaction tests in Section III, $EarnSurprise_{itj}$ is specific to each analyst *j*. $EarnSurprise_{itj}$ equals firm *i*'s actual earnings per share (EPS) for period *t* minus analyst *j*'s forecast of EPS, scaled by stock price measured at the end of year *t*−1 if earnings is announced inside the 10-K filing window, and 0 otherwise. We also control for year fixed effects and cluster the standard errors at the firm level.

The sample for these tests includes all analysts who actively follow the company. In particular, to be included in this analysis an analyst must issue at least one report for firm *i* within the six-month period *ending* on the day of firm *i*'s earnings announcements for year *t* and at least one report for the same firm within the 12-month period *beginning* on the day of the earnings announcement. All reports, the source of our target prices, are collected from Investext. A total of 24,133 observations at the analyst-firm-year level meet this criterion. The number of firms in the sample decreases from the previous analysis because of the coverage requirement, which is generally associated with the selection of larger firms with more actively traded securities.

Of our analyst-firm-year observations, 1,742, or 7.2 percent, have target-price revisions around the 10-K filings (i.e., *TgtPriceRevInd* = 1).[14] Hence, the majority of analysts do not react to the 10-K information. This low percentage could be due to at least three reasons. First, it is possible that some of this information has been pre-empted by quarterly reports or analysts' private research. Second, analysts might update their target price estimates after our seven-day event window. Third, analysts might deem the required incremental adjustments immaterial (or said differently, have a low signal-to-noise ratio) and, hence, not important enough to alter their prior expectation. To the extent that not enough analysts respond to the 10-K filings, this makes it more difficult for us to find support for our empirical prediction.

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[14] Not all analyst reports contain a current and previous target price, which is necessary to calculate the target price revision. These observations are excluded from the tests in this and the next subsections. As a robustness check, we replicate these tests using an alternative dependent variable, which is whether the analyst issued a report in the 10-K window. Untabulated results are qualitatively similar to those discussed in the text and indicate that analysts are more likely to issue reports when the magnitude of the unexpected adjustments is larger, providing support for the general notion that analysts are reacting to the 10-K note information.

Table 5, Panel A presents descriptive statistics, partitioned by the dependent variable (whether an analyst issued a report and target price revision around the 10-K filings), for the variables used in these tests. Consider the first set in which a target price was revised (i.e., $TgtPriceRevInd = 1$). The mean absolute value of the annual change in adjustments to net income (i.e., $|\Delta AdjNI|$) and EBIT ($|\Delta AdjEBIT|$) are both 0.9 percent of total lagged assets. The corresponding figures for the set in which a target price was not revised (i.e., $TgtPriceRevInd = 0$) are only 0.6 percent. Moreover, the standard deviations of these two variables are greater for companies with than for companies without a revised target price.

Table 5, Panel B summarizes the results of estimating Equations (3) and (4). Consistent with our prediction, column (1) indicates that the coefficient on $|\Delta AdjNI|$ is positive and significantly different from zero. This finding supports our prediction that the likelihood of analysts issuing reports and revising their target price estimates increases with the magnitude of the adjustment to net income before unusual items. Column (2) shows that the effect of adjustments to net income is driven by adjustments to EBIT and not by the non-EBIT adjustments. The coefficient on $|\Delta AdjEBIT|$ is positive and significantly different from zero, while the $|\Delta AdjOTH|$ coefficient is insignificant. Untabulated tests indicate this difference between the coefficients is statistically significant (p-value of 0.04). In other words, adjustments to the operating components of earnings (EBIT) affect the likelihood that analysts issue reports with target price revisions.

There is no evidence that adjustments to unusual items in the current or lagged period affect target price revision occurrence. In terms of control variables, the estimated coefficient on the magnitude of earnings surprises for those firms with earnings announcements around 10-K filings is significantly positive, consistent with our expectation. The probability of analysts revising target prices at the time of the 10-K filing is increasing in firm size, possibly because the economic significance of 10-K information is greater for larger firms.

To allow for the possibility that analysts use the note information in 10-Q reports to update their expectation for this year's adjustments for current year, we add to the regressions the corresponding absolute changes in the adjustment terms over the first three quarters of the year. Columns (3) and (4) show that, even after allowing for the update of analysts' expectation using quarterly note information, the results on our key variables $|\Delta AdjNI|$, $|\Delta AdjEBIT|$, and $|\Delta AdjOTH|$ are similar to those reported in columns (1) and (2) and, hence, corroborate our original inferences. Both $|AdjUNUSUAL|$ and $|LagAdjUNUSUAL|$ exhibit an insignificant effect on the probability of analysts issuing a report with a target price revision.

As a robustness test, we augment the regressions with $|MD\&A\ Tone|$. Columns (5) and (6) show these results. There is no evidence that the tone of the MD&A is related to analysts' decision to revise target prices. Our inferences about accounting adjustments computed from note information affecting target price revision occurrence remain unchanged. In another robustness test, we estimate Equations (3) and (4) by setting $TgtPriceRevInd$ to 0 when analysts reiterate their prior target price estimates (i.e., target price revisions equal 0). The untabulated findings and inferences are similar to those reported in Table 5. Note that we include target price revisions equal to 0 in the main tests because these observations are included in the Heckman estimation (to be conducted in the next subsection) in which the sample is conditioned on analysts issuing reports with sufficient information to compute target price revisions.

Overall, the Table 5 results are consistent with analysts using the detailed note information provided by the 10-K reports to analyze accounting issues when the potential benefits are greater—i.e., when unexpected adjustments to the financial statements are greater in magnitude.

TABLE 5

Probability of Analysts' Target Price Revisions around 10-K Filings

Panel A: Descriptive Statistics (n = 24,133 Analyst-Firm-Year-Level Obs.)

	TgtPriceRevInd = 1 (n = 1,742)					*TgtPriceRevInd* = 0 (n = 22,391)				
			Percentile					Percentile		
Variable	Mean	Std. Dev.	5%	50%	95%	Mean	Std. Dev.	5%	50%	95%
$|\Delta AdjNI|$	0.009	0.071	0.000	0.002	0.026	0.006	0.037	0.000	0.002	0.020
$|\Delta AdjEBIT|$	0.009	0.072	0.000	0.003	0.022	0.006	0.028	0.000	0.002	0.019
$|\Delta AdjOTH|$	0.006	0.013	0.000	0.002	0.025	0.006	0.030	0.000	0.001	0.021
$|AdjUNUSUAL|$	0.009	0.032	0.000	0.000	0.048	0.007	0.025	0.000	0.000	0.032
$|EarnSurprise|$	0.002	0.005	0.000	0.000	0.011	0.000	0.003	0.000	0.000	0.001
Book-Market	0.396	0.270	0.042	0.361	0.852	0.403	0.250	0.070	0.370	0.843
Size	8.913	1.377	6.757	8.868	11.345	8.862	1.407	6.623	8.824	11.310

Panel B: Multivariate Analysis

Explanatory Variable	Pred. Sign	(1)	(2)	(3)	(4)	(5)	(6)
$|\Delta AdjNI|$	+	0.701		0.740		1.15	
		(1.52)*		(1.68)**		(4.43)***	
$|\Delta AdjEBIT|$	+		1.177		1.194		1.219
			(6.66)***		(7.46)***		(6.21)***
$|\Delta AdjOTH|$	+		−0.667		−0.296		−0.170
			(−0.77)		(−0.42)		(−0.15)
$|AdjUNUSUAL|$	?	−0.033	−0.041	−0.146	−0.131	1.985	1.875
		(−0.03)	(−0.03)	(−0.11)	(−0.10)	(1.05)	(0.98)
$|LagAdjUNUSUAL|$	?	−0.335	−0.353	−0.254	−0.304	−1.191	−1.246
		(−0.29)	(−0.30)	(−0.22)	(−0.27)	(−0.70)	(−0.72)
$|EarnSurprise|$	+	92.562	92.567	96.537	95.741	100.3	99.404
		(8.78)***	(8.78)***	(8.76)***	(8.80)***	(6.51)***	(6.54)***
Book-Market	?	−0.030	−0.020	−0.036	−0.023	0.046	0.056
		(−0.14)	(−0.09)	(−0.17)	(−0.11)	(0.15)	(0.18)
Size	?	0.081	0.083	0.078	0.077	0.114	0.114
		(2.33)**	(2.36)**	(2.24)**	(2.17)**	(2.67)***	(2.62)***
$\Delta Adj3Q\_IND$	?			0.493**	0.465**	0.337	0.303
				(2.23)	(2.14)	(1.44)	(1.33)
$|\Delta AdjNI3Q|$	?			−35.977**		−28.11	
				(−2.09)		(−1.27)	
$|\Delta AdjEBIT3Q|$	?				−15.450		−10.246
					(−1.42)		(−0.95)
$|\Delta AdjOTH3Q|$	?				−1.597		2.160
					(−0.13)		(0.18)
$|MD\&A\ Tone|$	+					−0.228	−0.234
						(−0.52)	(−0.53)

(continued on next page)

TABLE 5 (continued)

Explanatory Variable	Pred. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.		24,133	24,133	24,133	24,133	13,430	13,430
Pseudo R^2 (%)		1.5	1.5	1.6	1.6	1.7	1.6
% Concordant		63.3	63.2	64.1	64.0	64.3	64.0

*, **, *** Denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Coefficient standard errors are in parentheses. Significance levels are based on one-tailed tests where there is a prediction for the sign of the coefficient and based on two-tailed tests otherwise.

This table examines the relation between the probability of analysts issuing a report and revising their target price around the 10-K filing window and the magnitude of the accounting adjustments. Panel A reports summary statistics on analyst-firm-year-level data. In Panel B, we estimate a logit model in which the dependent variable is whether an analyst updates his or her target price during the 10-K window. Independent variables include annual changes in adjustments to net income and its components, plus controls. Intercept and year fixed effects are included for each model but not tabulated. We estimate each model as a panel and cluster the standard errors at the firm level.

See Table 3 for variable definitions.

Analysts' Target Price Revisions around 10-K Filings

Having shown that the likelihood of analysts issuing a report with a target price revision is increasing in the absolute magnitude of the accounting adjustment, we next turn to the effect of the adjustments on target price revisions for those analysts who issue reports around the 10-K filing date. We use the following equations, which include a set of independent variables that are similar in spirit to Equations (3) and (4). Because the dependent variable is the signed value of analysts' target price revisions, the accounting adjustment variables are also based on their signed values. The regression models are:

$$\begin{aligned} TgtPriceRev_{itj} &= \beta_0 + \beta_1 \Delta AdjNI_{it} + \beta_2 AdjUNUSUAL_{it} + \beta_3 LagAdjUNUSUAL_{it} \\ &\quad + \beta_4 EarnSurprise_{itj} + \beta_5 Book\text{-}Market_{it} + \beta_6 Size_{it} + \varepsilon. \qquad (5) \\ TgtPriceRev_{itj} &= \beta_0 + \beta_1 \Delta AdjEBIT_{it} + \beta_2 \Delta AdjOTH_{it} + \beta_3 AdjUNUSUAL_{it} \\ &\quad + \beta_4 LagAdjUNUSUAL_{it} + \beta_5 EarnSurprise_{itj} + \beta_6 Book\text{-}Market_{it} \\ &\quad + \beta_7 Size_{it} + \varepsilon. \qquad (6) \end{aligned}$$

TgtPriceRev is analyst *j*'s target price forecast for firm *i*, issued one day before to five days after the year *t* 10-K filing date, minus analyst *j*'s prior target price forecast for firm *i*, scaled by the prior target price forecast.

Since we estimate Equations (5) and (6) on a subsample of analysts who issue a report with a target price revision within seven days of the 10-K filings (i.e., $TgtPriceRevInd = 1$), ordinary least squares estimates are subject to sample selection bias. We correct for this bias using the Heckman (1979) two-stage method, which assumes that the error terms in Equations (3) and (5) are jointly normal (the same for those in Equations (4) and (6)). We include the Inverse Mills' ratio, computed from the logistic estimates of Equations (3) and (4) into Equations (5) and (6), respectively, as an additional explanatory variable.

Descriptive statistics for the variables used in these tests are presented in Table 6, Panel A. The mean target price revision is 0.034 of the prior target price estimate. The average annual change in the adjustment to net income before unusual items scaled by lagged total assets, *ΔAdjNI*, is 0.001, while the averages for its two components, *ΔAdjEBIT* and *ΔAdjOTH*, are −0.001 and 0.002,

TABLE 6

Analysts' Target Price Revisions around 10-K Filings

Panel A: Descriptive Statistics

				Percentile		
Variable	**No. of Obs.**	**Mean**	**Std. Dev.**	**5%**	**50%**	**95%**
TgtPriceRev	1,742	0.034	0.2656	−0.208	0.000	0.278
ΔAdjNI	1,742	0.001	0.071	−0.005	0.000	0.023
ΔAdjEBIT	1,742	−0.001	0.073	−0.009	0.001	0.017
ΔAdjOTH	1,742	0.002	0.014	−0.008	−0.000	0.022
AdjUNUSUAL	1,742	0.005	0.033	−0.006	0.000	0.039
EarnSurprise	1,742	−0.000	0.005	−0.004	0.000	0.007
Book-Market	1,742	0.396	0.270	0.042	0.361	0.852
Size	1,742	8.913	1.377	6.757	8.868	11.345

Panel B: Multivariate Analysis

Explanatory Variable	**Pred. Sign**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ΔAdjNI	+	0.063		0.065		0.064	
		(2.18)**		(2.21)**		(1.41)*	
ΔAdjEBIT	+		0.066		0.068		0.069
			(1.85)**		(2.01)**		(1.41)*
ΔAdjOTH	+		0.548		0.248		0.466
			(1.20)		(0.64)		(0.93)
AdjUNUSUAL	?	0.177	0.185	0.182	0.190	0.739	0.738
		(0.54)	(0.56)	(0.55)	(0.57)	(0.75)	(0.74)
LagAdjUNUSUAL	?	0.052	0.050	0.056	0.046	0.169	0.146
		(0.40)	(0.38)	(0.43)	(0.35)	(0.37)	(0.32)
EarnSurprise	+	0.543	0.554	0.553	0.665	1.147	1.117
		(0.53)	(0.54)	(0.52)	(0.63)	(0.72)	(0.69)
Book-Market	?	−0.016	−0.015	−0.016	−0.016	−0.028	−0.026
		(−0.55)	(−0.53)	(−0.55)	(−0.54)	(−0.66)	(−0.61)
Size	?	0.005	0.005	0.005	0.005	0.008	0.007
		(1.24)	(1.22)	(1.27)	(1.18)	(1.34)	(1.20)
ΔAdj3Q_IND	?			0.006	0.006	0.008	0.010
				(0.33)	(0.37)	(0.36)	(0.40)
ΔAdjNI3Q	?			−1.312		−1.215	
				(−1.18)		(−1.19)	
ΔAdjEBIT3Q	?				−0.552		−0.202
					(−0.40)		(−0.15)
ΔAdjOTH3Q	?				1.555		2.272
					(0.59)		(0.78)
MD&A Tone	+					0.107	0.107
						(1.64)*	(1.59)*
Inverse Mills' Ratio	?	0.002	0.003	0.001	−0.004	0.009	0.007
		(0.07)	(0.08)	(0.03)	(−0.12)	(0.22)	(0.17)

(continued on next page)

TABLE 6 (continued)

Explanatory Variable	Pred. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.		1,742	1,742	1,742	1,742	1,038	1,038
Adj. R^2 (%)		1.4	1.5	1.5	1.6	1.4	1.7

*, **, *** Denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.
Coefficient t-statistics are in parentheses. Significance levels are based on one-tailed tests where there is a prediction for the sign of the coefficient and based on two-tailed tests otherwise.
This table examines the effect of accounting adjustments on analysts' target price revisions around the 10-K filing window. Panel A reports summary statistics on analyst-firm-year level data. Panel B presents the multivariate test results. In Panel B, we regress signed target price revisions (*TgtPriceRev*) on annual changes in adjustments to net income, and its components, plus controls. Intercept and year fixed effects are included for each model but not tabulated. We estimate each model as a panel and cluster the standard errors at the firm level.
See Table 3 for variable definitions.

respectively. By construction, the statistics for *Book-Market* and *Size* are identical to those reported for the "*TgtPriceRevInd* = 1" subsample in Table 5, Panel A.

Table 6, Panel B reports the estimation results. Column (1) shows that $\Delta AdjNI$ exhibits a positive association with analysts' target price revisions. Hence, an unexpected positive (negative) adjustment to net income before unusual items induces analysts to revise their target prices upward (downward). Column (2) indicates that the unexpected adjustment to the EBIT component of net income has the expected positive effect on target revisions; the coefficient on $\Delta AdjEBIT$ is positive and statistically significant. While the other component $\Delta AdjOTH$ exhibits an insignificant association with the change in target price estimates, untabulated tests indicate the difference between the $\Delta AdjEBIT$ and $\Delta AdjOTH$ coefficients is not significant.

As in the last subsection, we augment the two regressions with the cumulative changes in the adjustment terms over the first three quarters of the year, thereby allowing for the possibility that analysts update their expectation from prior year's annual adjustments using quarterly note information. The results reported in columns (3) and (4) are qualitatively unchanged. In addition, columns (5) and (6) show that our inferences remain unchanged if we control for the tone of the MD&A.

Overall, these results provide further support for the notion that analysts who update their target prices at the 10-K date are using the note information to analyze firms' accounting issues. In addition to our main variables of interest, we find that the earnings surprise is not related to the target price revisions for those observations when earnings announcements fall within the 10-K filing window.

Market Reaction to Accounting Adjustments and Analysts' Revisions around 10-K Filings

Given the findings that equity analysts also respond to accounting adjustments around 10-K filings with an update in their target price estimates, we examine the stock market reaction to accounting adjustments that is incremental to the reaction to analysts' revisions. In particular, we re-estimate the six specifications of Equations (1) and (2) originally reported in Table 4, augmented with the mean target price revision (*TgtPriceRev*) and mean earnings forecast revision (*EarnFcstRev*) for each firm and year. *TgtPriceRev* and *EarnFcstRev* are set equal to the value of the revision, if at least one analyst revises his/her target price estimate and earnings forecast, respectively, over the 10-K filing window, and 0 otherwise. This test is conducted at the firm-year level and, hence, the sample is identical to the one used in Table 4.

TABLE 7

Stock Market Response to Accounting Adjustments and Analysts' Revisions around 10-K Filings

Explanatory Variable	Pred. Sign	(1)	(2)	(3)	(4)	(5)	(6)
ΔAdjNI	+	0.062		0.063		0.070	
		(3.69)***		(3.77)***		(3.34)***	
ΔAdjEBIT	+		0.077		0.079		0.083
			(3.24)***		(3.42)***		(4.33)***
ΔAdjOTH	+		0.052		0.053		0.049
			(4.71)***		(4.67)***		(1.93)**
AdjUNUSUAL	?	−0.120	−0.120	−0.120	−0.120	−0.070	−0.071
		(−2.69)***	(−2.70)***	(−2.69)***	(−2.70)***	(−1.19)	(−1.20)
LagAdjUNUSUAL	?	0.017	0.017	0.017	0.017	−0.026	−0.025
		(0.56)	(0.56)	(0.58)	(0.57)	(−0.74)	(−0.73)
TgtPriceRev	+	0.026	0.026	0.026	0.026	0.027	0.027
		(2.62)***	(2.62)***	(2.61)***	(2.62)***	(2.85)***	(2.85)***
EarnFcstRev	+	0.010	0.010	0.010	0.010	0.010	0.010
		(5.71)***	(5.70)***	(5.70)***	(5.69)***	(5.19)***	(5.14)***
EarnSurprise	+	0.327	0.329	0.325	0.327	0.376	0.377
		(2.47)**	(2.49)**	(2.45)***	(2.45)***	(2.49)***	(2.48)***
Book-Market	?	0.002	0.002	0.002	0.002	0.011	0.011
		(0.69)	(0.68)	(0.67)	(0.65)	(2.10)**	(2.08)**
Size	?	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
		(−1.62)	(−1.63)	(−1.67)*	(−1.68)*	(−0.61)	(−0.61)
ΔAdj3Q_IND	?			0.003	0.003	0.003	0.003
				(0.95)	(0.93)	(0.89)	(0.89)
ΔAdjNI3Q	?			−0.140		−0.175	
				(−1.55)		(−1.38)	
ΔAdjEBIT3Q	?				−0.143		−0.164
					(−1.46)		(−1.24)
ΔAdjOTH3Q	?				−0.137		−0.126
					(−0.74)		(−0.54)
MD&A Tone	+					0.013	0.013
						(2.22)**	(2.23)***
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.		3,069	3,069	3,069	3,069	1,786	1,786
Adj. R^2 (%)		7.3	7.3	7.3	7.4	8.0	8.1

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*, **, *** Denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Coefficient t-statistics are in parentheses. Significance levels are based on one-tailed tests where there is a prediction for the sign of the coefficient and based on two-tailed tests otherwise.

This table examines the effect of accounting adjustments on stock returns around the 10-K filing window. We regress event-window cumulative abnormal stock returns (*CAR*) on annual changes in adjustments to net income and its components, plus controls. In addition to the control variables reported in Table 4, we also include analysts' target price revisions, and earnings forecast revisions. Intercept and year fixed effects are included for each model but not tabulated. We estimate each model as a panel and cluster the standard errors at the firm level.

See Table 3 for variable definitions.

Table 7 reports that, across all six model specifications, both analysts' target price and earnings forecast revisions have a statistically positive effect on the market reactions around 10-K filings. However, analysts' revisions do not subsume the explanatory power of the accounting adjustment variables. Specifically, the values and statistical significance of the coefficients on the adjustment terms are about the same as those reported in Table 4. This finding suggests that other financial statement users, such as institutional investors and money managers, are also exploring the note information in their calculation of accounting adjustments. As a result, the accounting adjustment terms exhibit incremental explanatory power over and above those of analysts' target price and earnings forecasts revisions. The results are also consistent with analysts incorporating some note information, but not all. This finding is in line with prior studies documenting that security analysts are not fully rational or efficient in processing financial statement information. See Beyer et al. (2010, 334) for a discussion of studies that support this assertion.

Similar to the Table 4 market reaction tests, both coefficients on $\Delta AdjEBIT$ and $\Delta AdjOTH$ are positive and statistically significant, consistent with the market valuing both the adjustment to EBIT and other components of net income before unusual items. While the estimated coefficients on $\Delta AdjEBIT$ are larger than those on $\Delta AdjOTH$, untabulated tests indicate that these two coefficients are not statistically significant from each other. Hence, the market finds adjustments to both components of net income to be informative.

V. CONCLUSION

We examine the valuation of financial statement note information around 10-K filings, the point at which this information first becomes available to the public. We conjecture that financial statement users explore the information in these notes to compute accounting adjustments to correct the imperfections in financial statements. We use a set of financial statement adjustments implemented by Moody's to proxy for the accounting adjustments that financial statement users *could* make. We find that stock returns around 10-K filings are positively related to the accounting adjustments calculated from note information. We further find that the likelihood of equity analysts issuing a report and updating their target price estimates at the 10-K date is increasing in the magnitude of the adjustments. Those analysts who do issue reports and update their target prices at this time revise their estimates consistent with the sign and magnitude of the adjustments. These findings are consistent with financial statement users utilizing financial statement note information to make accounting adjustments, thereby incorporating this information into stock prices.

Prior studies (1) examine the market reactions to 10-K filings typically without isolating the specific information in the 10-K reports that is valued by investors, (2) show that financial statement note information is reflected in equity prices using a long-window research design, and (3) document that equity analysts can play an important role in this process. We contribute to these strands of literature by examining the valuation of accounting adjustments and, hence, the financial statement note information used to compute them, in a short-window event-study design, as well as by showing the role played by equity analysts in the incorporation of note information into stock prices. Our short-window research design allows us to more tightly link the 10-K accounting information to the market and analysts' reactions and rule out the possibility that our results are driven by correlated omitted variables.

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APPENDIX A

Description of Moody's Accounting Adjustments

In this appendix, we describe each of Moody's standard and nonstandard adjustments, their purposes, and their effect on net income before unusual items and EBIT. Jonas (2006) provides more details on its methodology. The first six adjustments take a more standardized form and are summarized in Table 1. Two other adjustments reflected in our analysis include "Unusual & Non-Recurring Items" and "Non-Standard Adjustments," which, depending on their nature, can affect any account.

(1) Underfunded Defined Benefit Pensions

Under current GAAP, pension liabilities are not reflective of a company's obligation to its pension trust, and pension expenses are subject to smoothing and the recognition of actuarial gains on pension assets. Moody's recognizes as debt the underfunded pension amount, estimated by the difference between the projected benefit obligation (PBO) and the fair value of pension assets. No adjustments are made to overfunded pension amounts. Moody's defines pension expense as the year's service cost, plus Moody's imputed interest on the PBO, minus actual earnings on plan assets (up to the amount of interest cost imputed to restrict interest cost to be non-positive). Hence, Moody's eliminates the amortization of prior service cost and actuarial gains and losses in the computation of pension expense. Instead, it recognizes actual gains or losses on pension assets in other non-recurring expenses (gains) below EBIT. This adjustment eliminates smoothing. By capping the amount of gains allowed up to the amount of interest cost, it avoids reporting net periodic pension income.

After Moody's adjustment, cost of goods sold, SG&A, and operating expenses increases[15] by the service cost minus GAAP pension costs. Interest expense increases by Moody's imputed interest cost on the PBO. Other non-recurring expenses or gains increase (decrease) by actual losses (gains) on pension assets, with gains allowed up to the amount of interest cost. Tax expense decreases by the tax effect of the additional pension costs. Unusual and non-recurring items decrease by the after-tax effect of the additional pension costs. Depending on the amount of GAAP service cost and pension costs, EBIT and net income before unusual items can increase or decrease.

(2) Operating Leases

Unlike capital leases, the obligations associated with operating leases are not required to be recognized as liabilities under current GAAP. Companies can structure the lease transactions to ensure they are operating leases and, hence, operating leases represent a common form of off-balance sheet financing. Moody's treats operating leases as capital leases to better reflect the underlying economics of the transactions. It reclassifies rental expense from COGS, SG&A, and operating expenses to interest and depreciation expenses.

After Moody's adjustment, COGS, SG&A, and operating expenses decrease by the interest and depreciation components of rental expense, and interest and depreciation expenses increase by one-third and two-thirds of rental expense, respectively. As a result, EBIT increases by the interest component of rental expense. These adjustments offset each other, leaving net income before unusual items unchanged. In other words, this adjustment shifts income from below to above EBIT.

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[15] Unless specified otherwise, Moody's adjusts the cost of goods sold, SG&A, and operating expense accounts on a proportional basis.

(3) Hybrid Securities

Under current GAAP, hybrid securities are classified and accounted for as pure debt, pure equity, or noncontrolling interest. This could be misleading because hybrid securities typically exhibit attributes of both debt and equity. Moody's reclassifies hybrid securities to debt and equity on a *pro rata* basis according to the debt-equity continuum it assigns to the securities, which is based on Moody's own research. Moody's adjusts interest expense and preferred dividends accordingly.

After Moody's adjustment, on one hand, preferred dividends decreases by the interest expense for the assigned debt portion of hybrid securities classified as all equity and increases by the preferred dividends for the assigned equity portion of hybrid securities classified as pure debt or noncontrolling interest. On the other hand, interest expense increases by the interest expense for the calculated debt portion of hybrid securities classified as all equity or minority interest and decreases by the preferred dividends for the calculated equity portion of hybrid securities classified as pure debt. As a result, both EBIT and net income before unusual items are unaffected.

(4) Securitizations

Under current GAAP, companies report as sales the transfer of assets to securitization trusts. However, Moody's finds that companies usually retain significant risks related to the assets transferred for nearly all of the securitizations they review. Moody's reclassifies securitization transactions that do not fully transfer risk as collateralized borrowings.

After Moody's adjustment, other expense decreases by the imputed interest on the amount of additional collateralized borrowings, while interest expense increases by the imputed interest on the amount of additional collateralized borrowings. As a result, EBIT increases or remains unchanged (dependent upon where the company has recorded the securitization expense), but net income before unusual items is unaffected.

(5) Capitalized Interest

Under current GAAP, interest costs attributed to the financing of self-constructed assets are capitalized. This not only overstates assets and net income, but it also mixes up financing transactions with operating activities. Moody's expenses the interest capitalized during the current period and adjusts related balance sheet items accordingly.

After Moody's adjustment, interest expense increases by the amount of capitalized interest during the current period. Tax expense decreases by the tax effect of the additional interest expense. Unusual and non-recurring items decrease by the after-tax effect of the additional interest expense. As a result, EBIT is not affected, while net income before unusual items decreases.

(6) Employee Stock Compensation

Before June 30, 2005, GAAP encouraged, but did not require the expensing of employee stock options (ESO) at fair value and most firms chose to use the intrinsic value approach to record zero expense for options granted at the money. This leads to the understatement of operating expenses for many firms, especially when compared to their counterparts that are light users of employee stock options. Moody's expenses the cost of employee stock options using the fair value method.

After Moody's adjustment, SG&A expense increases by the ESO cost and tax expense decreases by the tax effect of the ESO expense. Unusual and non-recurring items decrease by the after-tax effect of the additional ESO expense. As a result, both EBIT and net income before unusual items decrease.

(7) Unusual & Non-Recurring Items

Under current GAAP, certain unusual and non-recurring items are reported under operating income or EBIT. However, these unusually large or infrequent transactions are transitory in nature and, therefore, have little implications for future earnings (Ali and Zarowin 1992). Moody's reclassifies the effects of these transactions, net of the related tax effect, to a special income statement line item (Unusual & Non-Recurring Items—Adjustments after Tax) that is below net income before unusual items.

Depending on the line items being adjusted, EBIT can be affected, but net income before unusual items will be affected by construction. These items include atypical large transactions that are unlikely to recur and gains or losses from the infrequent sales of non-operating assets. For example, the selling of real estate by a company that rarely sells real estate and tax benefits of deductible goodwill whose depreciable life is ending.

(8) Non-Standard Adjustments

Besides the standard adjustments, Moody's also makes nonstandard adjustments on a case-by-case basis. These adjustments have the same objective as standard adjustments, which is to better reflect economic reality by using estimates or assumptions that are more prudent. Unlike the standard adjustments, however, these adjustments are at the discretion of the Moody's analyst. Non-standard adjustments usually relate to highly judgmental areas such as asset valuation allowances, impairments of assets, and contingent liabilities.

(9) Inventory on a LIFO Cost Basis

Current U.S. GAAP allows companies to choose the LIFO cost flow assumption for inventory accounting. In an inflationary environment, LIFO inventory cost understates the value of inventory. Moody's adjusts the reported inventory balance on the LIFO basis using the FIFO cost assumption. However, it makes no adjustment to the income statement, because it believes that LIFO cost of goods sold better reflects current cost. As a result, this adjustment has no effect on the income statement, and given our earnings focus in this study, this adjustment is hence excluded from our analysis.

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Earnings Management Using Real Activities: Evidence from Nonprofit Hospitals

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ABSTRACT: We extend the literature on earnings management through real operating decisions by providing insight into the types of expenditures (core versus noncore and operating versus non-operating activities) affected by earnings management. We partition a sample of California nonprofit hospitals based on their earnings management incentives. We find that expenditures on non-operating and non-revenue-generating activities appear to decrease in hospitals with incentives to engage in such behavior, while core patient care activities remain unchanged. We also find evidence of earnings management in non-core operational expenses. Second, we analyze real earnings management related to pay-for-performance incentives and find that hospitals with stronger performance incentives exhibit a significant incremental decrease in expenditures. Finally, we examine two different kinds of behavior to discriminate between earnings management and good operational decisions and provide weak evidence to support opportunism rather than good management. Together, these results provide evidence of the use of real operating decisions to manage earnings.

Keywords: *real operating decisions; earnings management; nonprofit organizations.*

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I. INTRODUCTION

Earnings management through manipulation of firms' accounting accruals has been extensively investigated by accounting researchers (e.g., Schipper 1989; Healy and Wahlen 1999). Earnings management that results from altering operating decisions (real activity management),[1] has also been analyzed, but due to data limitations, documentation has been limited to a few categories of expenditures (Baber et al. 1991; Dechow and Sloan 1991; Bushee 1998; Roychowdhury 2006; Cohen et al. 2008; Cohen et al. 2010). Our study employs a rich dataset from nonprofit hospitals to provide additional insight into this issue.

Analysis of nonprofit firms is valuable because, while for-profit firms focus on meeting or beating external benchmarks (e.g., analysts' forecasts) to increase stock price, nonprofit hospitals have incentives to increase income when it is below zero (for reasons similar to for-profit firms), but also to decrease income when it is high to avoid scrutiny from regulators and from third-party payors, that pressure hospitals for discounts when profits are large.[2] Leone and Van Horne (2005) examine accruals management in nonprofit hospitals. They use a benchmark of zero operating income to provide evidence that nonprofit hospital managers manipulate accruals to manage to this benchmark.

We analyze activities across 432 nonprofit hospital years in California from 1998–2003. These data include detailed expenditures[3] at the department level that allow us to identify whether managers are engaging in real activity management and also to determine specific areas where this occurs. We are thus able to gain insight into the extent to which managers alter firm operations to achieve specific income benchmarks. Given the absence of detailed data about operations in publicly traded companies, prior research has generally been limited to a small set of operational activities measured from the income statement (e.g., research and development expense, advertising expense). An exception is Cohen et al. (2010), who use a unique database of monthly advertising expenditures by media outlets and find that managers reduce advertising expenditures to avoid losses and earnings decreases. The authors point out that using expense to measure real activities manipulation is problematic because expenses can include the confounding influences of accruals management. Our detailed cost report data are free from the confounding influence of accruals manipulation.

We also extend this literature by considering real activities management stemming from compensation incentives. While there is a large literature showing widespread earnings management driven by corporate management's equity-based incentives (e.g., Bartov and Mohanram 2004; Bergstresser and Philippon 2006; Cheng and Warfield 2005; Burns and Kedia 2006; Efendi et al. 2007), in our nonprofit setting, there is no equity-based compensation, although incentive compensation can be based on firm financial performance.

It is important to separate compensation incentives from incentives to meet an earnings benchmark because these incentives can conflict with each other. For example, hospital managers who have incentives to manage earnings downward to avoid scrutiny can also face compensation incentives to manage earnings upward. To our knowledge, ours is the first study to incorporate compensation incentives into real activities management tests.

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[1] We use the term "real activity management" rather than "real earnings management" to emphasize managers changing the underlying economic activities of the firm, whereas accruals management reflects managers' choices of accounting methods used to represent those underlying activities.

[2] While managers of for-profit firms can have bonus-based incentives to manage earnings downward (Healy 1985), market incentives to increase earnings are likely to counter such incentives.

[3] Throughout the paper, we use the term "expenditure" rather than "expense" to emphasize that we are focusing on direct expenditures, absent any accruals.

We analyze both core and non-core activities, expecting that managers make decisions about non-core activities to manage income, but refrain from such activities in areas of core competence. We also attempt to understand whether this behavior is due to earnings management versus effective operational management. We examine whether the changes in expenditure reverse in future periods and how these decisions affect future performance.

Our results indicate that managers engage in real activity management to meet earnings benchmarks via both expenditure manipulation and asset management. We find evidence that nonprofit hospitals with pre-managed earnings slightly below zero appear to manage expenditures downward in non-operating activities (for example, curtailing spending to maintain or refurbish office space rented to physicians). Managers also decrease expenditures in non-revenue-generating areas such as general services, research and administration, and public relations, among others. However, we find little evidence of similar earnings management in core operating areas (such as inpatient care and ancillary medical services). When earnings are above the benchmark, managers appear to increase non-operating expenses, resulting in relatively lower net income. We also find that nonprofit hospitals with pre-managed earnings well above zero have relatively lower asset sales, resulting in comparatively lower levels of revenue and correspondingly lower levels of profit. Real activity management in response to compensation incentives occurs primarily through reduction of expenditures rather than asset management.

Results from our tests to discriminate earnings management from appropriate operational decisions provide evidence that many of the expenditure changes reverse in the next period, indicating that they were likely temporary decisions rather than long-term strategies. In addition, we find weak evidence that when nonprofit hospitals with incentives to decrease expenditures have met their benchmarks through changes in their non-operating and non-revenue-generating activities, their future net income is lower relative to remaining sample hospitals. However, we find no future decreases in net income when we base the analysis on management of operating expenditures. This is not surprising, given our lack of evidence of earnings management around operating expenditures.

This study contributes to the accounting research stream that investigates real activities manipulation. We extend the inquiry to the nonprofit setting and provide evidence of specific areas in which real activity management appears to be taking place. We also find evidence that managers not only manage income upward to achieve a positive net income, but also manage income downward to avoid regulatory scrutiny. We find that managers respond differentially to incentive-based compensation in their real earnings management activities. In addition, we find that real earnings management behavior has a negative effect on future operations. Our sensitivity analyses provide further support for our conjecture that the real activity management we identify is related to earnings management rather than operations management. To the extent that tax exemption is a tool that can be used to accomplish governmental purposes, regulators could be interested in the indirect costs associated with pressure on nonprofit hospitals to decrease reported profits.

Section II reviews the extant literature and develops hypotheses. Section III details our empirical tests, presents our results, and provides sensitivity analysis. In Section IV, we discuss the results and conclude.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Earnings management research has a long and rich history. Schipper (1989) provides an overview of the early earnings management literature with a focus on discretionary accruals. Schipper (1989) also describes settings in which managers make operating decisions that affect earnings positively. A more recent stream examines real activity management in for-profit firms with a focus on manipulation of research and development expenditures (Baber et al. 1991; Dechow and Sloan 1991; Bushee 1998). Roychowdhury (2006) finds that firms reporting small positive earnings use techniques such as price discounts (to increase sales), overproduction (to spread fixed costs over more units, thus reducing COGS), and reduction of discretionary expenses to avoid reporting annual losses and negative changes in earnings. Gunny (2010) finds that firms use real activities manipulation to report small positive earnings (or small changes in earnings); however, these firms have relatively higher subsequent performance consistent with managers attaining benefits that allow better future performance or signaling. The results in Bartov (1993) suggest that managers sell fixed assets to avoid reporting negative earnings and incurring debt covenant violations. Herrmann et al. (2003) investigate Japanese managers' use of income from asset sales to manage earnings. They find that firms increase (decrease) earnings through sales of fixed assets and marketable securities when current operating income falls below (above) management's forecast of operating income.

With a focus on reported earnings, Graham et al. (2005) survey 401 financial executives regarding factors that affect their decisions about measurement of financial performance. Results of the survey suggest that accounting earnings benchmarks are more important than cash flows and managers want to meet or beat these benchmarks because they are concerned about subsequent effects on stock price, their careers, and any benefits to external reputation. A majority of respondents preferred smooth earnings patterns, were willing to sacrifice economic value for smooth earnings, and preferred to manage earnings through real actions as opposed to accounting actions. Most managers in the survey reported they would also avoid initiating a positive net present value project if the current quarter's consensus earnings forecast would be missed.

The survey evidence in Graham et al. (2005) suggests that executives are willing to manage several types of expenditures such as research and development, advertising, travel, and maintenance. However, prior investigation of real activity management has focused primarily on opportunistic reductions in research and development expenditures—most likely because research and development expense is usually disclosed separately in the financial statements of publicly traded companies, whereas expenditures on advertising and travel are aggregated in selling, general, and administrative expense.

Few researchers have examined earnings management in nonprofit organizations. Leone and Van Horn (2005) test for the existence of earnings management by examining both discretionary accounting adjustments (accruals) and discretionary expenditures on charity care in a sample of U.S. nonprofit hospitals. With regard to accruals, they find similar patterns of earnings management in both nonprofit and for-profit institutions. They also find that charity care expenditures are positively correlated with current income (excluding current year changes in charity care expenditures), which suggests real earnings management behavior.

Management toward an Earnings Benchmark

Nonprofit hospitals include those governed by universities, communities, and religious organizations. Examples include Scripps Healthcare and Catholic Healthcare West. Mission statements for nonprofit hospitals often articulate social objectives. Thus, unlike for-profit hospitals, profit is not the only (or perhaps even the primary) objective for hospital managers. However, nonprofit hospitals and their sponsoring charities are self-sustaining and cannot rely on government subsidies for operations. In addition, for the most part, donor support is too limited to fund ongoing operations. Revenues from operations fund these costs, so profit is an important part of their overall objective function. If nonprofit hospitals incur losses, then their managers have similar pressures as for-profit managers, i.e., a need to return to profitability.

In response to these incentives to focus on financial performance, we expect nonprofit hospital managers to manage accounting performance to achieve earnings benchmarks. We examine real activity management rather than accruals management, which was the primary focus of Leone and Van Horn (2005). Managers could prefer real activity management because accruals management takes place at the end of the fiscal year and managers face uncertainty about the accounting treatments that auditors will allow. In contrast, managers have a great deal of control over expenditure decisions and the timing of asset sales.

For earnings management toward a benchmark to occur, at some point during the period, a manager must realize that accounting performance will miss the benchmark. The manager could then manage discretionary accruals or change some real activity, resulting in a boost to (or decrease in) accounting performance for that period.[4]

For real activity management to affect accounting performance in a manner similar to accruals management, the real activity must have two characteristics. First, such accounting-performance-enhancing changes must be implementable in the short term. This means that activities such as reengineering operations to reduce cost would not constitute real activity management—these types of activities take time to design and implement and would simply be a part of good management. Second, the impact on accounting performance must be immediate. For example, changing collection policies is relatively simple and quickly implemented, but the impact on accounting performance would not occur in the short term. Thus, management of this activity might be part of an overall management strategy, but is unlikely to be used to manage period-end accounting performance.

We examine activities in which decisions can be quickly implemented and will rapidly affect accounting performance. We expect the greatest amount of real earnings management to be associated with non-revenue-generating and non-operating activities, because most revenue-generating activities within hospitals (such as patient room and board functions and diagnostic tests) include a large portion of fixed costs that might be difficult to manage. Another consideration is that revenue-generating activities are part of the hospital's core services; any reduction could have quality (and therefore reputation) implications. For example, one way to reduce nursing cost would be to substitute cheaper, lesser-skilled licensed vocational nurses for more expensive, highly skilled registered nurses. While this provides cost savings in the short term, there is a potential for reducing the quality of care, with concomitant long-term increases in cost or losses in revenues.

Non-revenue-generating activities are part of the hospital's overall operations, but are not directly related to patient care efforts. Changes in these activities are less likely to negatively impact the quality of patient care and are better candidates for reductions. In addition, many of them are somewhat lumpy and can be reduced in the short term. For example, advertising expenditures could be cut back or postponed until the following period. Governing board expenditures such as meeting costs and hospital-related activities such as travel and fees paid for special seminars could be reduced fairly easily. Non-operating activities include retail operations such as renting office space to physicians and other clinical personnel, operating a nearby hotel for patient families, and other activities that are not directly related to the nonprofit mission of providing patient care. Expenditures to maintain the office and hotel buildings, such as painting and refurbishing, can easily be deferred when hospital operating income is likely to fall below the benchmark.

While we expect less real earnings management in operating expenditures overall, departments associated with ambulatory (outpatient) and ancillary (e.g., radiology, therapy clinics, blood bank) services are less central to the hospital's core mission and have fewer fixed costs. Thus, if we find evidence of real earnings management in operating expenditures, it is more likely to occur in ambulatory and ancillary, rather than daily hospital services departments.

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[4] Unlike real activity management, accrual management can occur after year-end, but prior to release of accounting reports.

In addition to expenditure reduction, accounting performance can be boosted by increasing revenues through the sale of assets. As long as the asset is not directly related to core activities, such sales can increase accounting performance without compromising quality. To summarize this discussion, we hypothesize:

H1a: When nonprofit organizations' accounting performance is likely to be below benchmark, managers will decrease spending on non-operating and non-revenue-generating activities.

H1b: When nonprofit organizations' accounting performance is likely to be below benchmark, decreases in spending for operating activities tend to occur more frequently in ambulatory and ancillary expenditures than in daily hospital services expenditures.

H1c: When nonprofit organizations' accounting performance is likely to be below benchmark, managers will increase asset sales that result in net gains.

Relative to for-profit organizations, nonprofits have strong incentives to moderate their profits. Highly profitable nonprofit hospitals come under a great deal of scrutiny. The media targets specific hospitals when their profits are excessive. For example, the *Wall Street Journal* featured a front-page article about Baptist Hospital in Nashville, Tennessee entitled, "Really Operating: Nonprofit Hospitals Sometimes are that in Little but Name." The article took the hospital to task for the size of its profits ($20 million) in addition to a number of other excesses (Langley 1997). Political scrutiny also focuses on nonprofit hospitals and healthcare organizations with large profits. During the time period of our study, pressure about tax-exempt status was applied at all levels: federal, state, and county. For example, several Utah assessors took a healthcare system with 22 hospitals to court in 1994 over their tax-exempt status because the hospitals were not providing enough charity care. Two counties in Utah revisited the issue with the same hospital system in 2001, again citing problems with the level of community benefits (Galloro 2003). The IRS also revoked the tax-exempt status of the six-hospital St. David's Health Care System in Austin, Texas in 2000 (Anonymous 2003). In Galloro (2003, 49), James Bently, the American Hospital Association's senior vice president of strategic policy planning, is quoted as stating that tax exemption is "always being looked at someplace ... Attention waxes and wanes, but it isn't out of the ordinary."

While inviting regulatory scrutiny (at all levels of government), high profits can also alienate donors and conflict with aspects of the hospital's mission (i.e., to provide community benefit such as charity care or high-quality care at low prices). High profits also invite third-party payors to negotiate for increased discounts.

Hospital managers can reduce scrutiny by lowering income. This could be accomplished by increasing some types of expenditures, but only when income is potentially high. Increasing one-time expenditures would be relatively straightforward for non-revenue-generating activities, such as those for public relations and the governing board. For example, advertising could be increased and board retreats could be scheduled at resort areas. For non-operating activities, office space rented to physicians could be remodeled or refurbished to increase expenditures. Finally, increasing expenditures for operating activities would likely increase the quality of hospital core services.

Hospital managers could also lower current income by deferring asset sales that result in gains. While such situations would not explicitly reduce current income in the same fashion as increasing expenditures, the net effect would be to lower income relative to what it would be with the asset sales. In summary, we expect that nonprofit hospital managers with high levels of accounting performance will manage real activities to reduce performance, thereby reducing the risk of additional scrutiny.

H2a: When nonprofit organizations' accounting performance is likely to be above benchmark, managers will increase spending on operating, non-operating, and non-revenue-generating activities.

H2b: When nonprofit organizations' accounting performance is likely to be above benchmark, managers will decrease asset sales that would result in gains.[5]

Management Related to Pay-for-Performance (P4P) Incentives

A number of studies suggest that financial performance incentives in for-profit and nonprofit hospitals are similar. For example, Brickley and Van Horn (2002) examine data from nonprofit and for-profit hospitals from 1991 to 1995, finding that CEO turnover and compensation are significantly related to financial performance (measured as return on assets). They provide evidence that the turnover/performance relation in nonprofit hospitals is stronger than in for-profit hospitals and other for-profit corporations. In a similar study, Eldenburg et al. (2004) use California hospital data from 1980 through 1996 to show that both board and CEO turnover are related to poor financial performance in for-profit and nonprofit hospitals.

Nonprofit hospitals increasingly use performance-based compensation contracts that encourage managers to improve profitability (i.e., enhance revenues and reduce costs) and better align hospital and managerial incentives (Lambert and Larcker 1995; Eldenburg and Krishnan 2008; Eldenburg et al. 2009). Leone and Van Horn (2005) suggest that, with increases in incentive contracting, nonprofit managers begin to act more like managers of for-profit hospitals. Glaeser (2004) suggests that the behavior of nonprofit and for-profit hospitals converges when commercialism increases in nonprofits. Such an increase in commercialism can occur in response to declining rents and a rise in returns to commercialism.

Hospital managers whose compensation contracts include P4P have incentives to increase income by increasing revenues and operating efficiently (i.e., optimize cost). These incentives differ from the incentives to meet an earnings benchmark discussed earlier because they are ongoing and do not represent a response to a given level of earnings. P4P incentives will most notably interact with benchmark-related incentives to decrease income by increasing expenditures. For these firms, P4P incentives act in opposition to the benchmark-related earnings management incentives. Indeed, we expect the direct compensation incentives to manage income upward to be more salient to managers than incentives to manage income downward toward the benchmark. Managers will receive an immediate benefit from such earnings management, whereas the consequences of additional scrutiny are much more uncertain. We hypothesize:

H3a: Pay-for-performance incentives moderate real earnings management incentives to increase spending on operating, non-operating, and non-revenue-generating activities.

The impact of P4P for managers with benchmark-related incentives to increase income is less clear. Because managers with P4P incentives have a continual incentive to increase income and their firms may be operating at efficient levels, it is questionable whether these managers will have the ability to further reduce expenditure levels based upon short-term, benchmark-related incentives. On the other hand, the combined incentive stemming from both types of incentives may make it more likely that managers will respond to the incentive to increase income. We do not include a separate P4P hypothesis for managers with incentives to increase income, but we include an interaction term in our empirical models to explore the combined incentive.

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[5] Note that the benchmark referred to in H1a and H1b differs from the benchmark referred to in H2a and H2b. For example, hospital managers have incentives for non-negative return on assets for H1a and H1b, but have incentives to have a return on assets less than, say, 5 percent to avoid scrutiny.

Hospitals are continually replacing assets due to new diagnostic methods and improvements in technology. Unlike expenditure levels discussed in H3a, managers thus have a continuing source of assets that can be sold to facilitate earnings management. Managers with P4P contracts have a greater incentive to sell rather than retain excess assets that would result in a net gain. This incentive exists for all managers with P4P contracts, including those managers with benchmark-related incentives to increase or decrease income. P4P incentives are consistent with benchmark-related incentives to increase income, but work in opposition to benchmark-related incentives to decrease income. Our hypothesis is:

> **H3b:** Pay-for-performance incentives moderate real earnings management incentives to decrease asset sales that would result in gains.

III. EMPIRICAL ANALYSIS

Descriptive Statistics

The initial sample consists of all California nonprofit hospitals over the years 1998–2003. Nonprofit hospitals include church-owned and community hospitals registered under IRS Section 501(c)(3). We analyze California hospitals because the Office of Statewide Health Planning and Development collects department-level financial and nonfinancial data for all California hospitals, which include a variety of hospital ownership types. The data include cost report information and subcategories of aggregations used on financial statements. California requires that all of the reported data reconcile with hospital financial statements, which must conform to U.S. Generally Accepted Accounting Principles. We exclude substance abuse and psychiatric hospitals and those that provide extensive long-term nursing care. Production functions and patient mix for these hospitals differ from those of acute care general hospitals. In addition, government reimbursement programs for specialty hospitals differ from reimbursement programs for general hospitals. Finally, we exclude 124 observations due to lack of data for specific variables. Of the remaining 179 hospitals, we exclude an additional 84 hospitals because the relation between pay and performance is negative in the compensation equation. Overall, our sample consists of 95 hospitals and 432 hospital years.

Table 1, Panel A provides descriptive statistics for the sample hospitals. The mean (median) net revenue for the sample is $116 million ($79 million). The mean (median) net income for the sample is $6.2 million ($1.6 million). Mean (median) total assets are $129 million ($79 million). The skewness of these distributions suggests that the sample includes proportionately more small, rural hospitals than large, urban hospitals, which is typical of hospital demographics in Western states. Total expenditures for non-operating (non-revenue-generating) activities are on average 20 percent (36 percent) of the absolute value of net income, so it is likely that management of these expenditures could have a material effect on net income. The largest component of non-revenue-generating activities is general services, with untabled mean (median) expenditures of $6 million ($4.2 million). General services includes activities such as printing and duplicating, grounds, communications, plant maintenance, and support departments for basic operations such as laundry, pharmacy, and dietary. Total expenditures for operating activities are $64 million, on average. Operating expenditures include daily hospital services, ambulatory services, and ancillary services, which average $19.9, $7.6, and $36.4 million, respectively. The mean (median) gain on sale of property is $94,000 ($0). The range is large, however, with a maximum of $4.3 million (2.24 percent of assets). Thus, while relatively uncommon, asset dispositions can have a material effect on net income. Table 1, Panel B, provides the Pearson correlations. Changes in non-operating, non-

TABLE 1
Descriptive Statistics

Panel A: Descriptive Statistics for 432 California Nonprofit Hospital Years (1998–2003) with Available Data

Variables (000s, except percents)	Mean	Median	Std. Dev.	1st Quartile	3rd Quartile	Min.	Max.
Net revenues	115,720	79,252	116,957	40,777	150,429	5,138	651,350
Net income	6,195	1,620	17,586	−1,044	6,779	−18,565	112,951
Total assets	128,840	78,751	141,678	36,830	167,171	2,123	791,989
Pay-for-performance sensitivity	3.76	1.69	5.36	0.76	3.97	0.07	27.17
Total Compensation	1,467	837	1,667	441	1,868	26	8,168
Non-operating activity expenditures	901	216	1,614	0	804	0	8,355
ΔNon-operating activity expenditures	80	0	1,385	−48	134	−6,513	6,441
Absolute value [ΔNon-operating activity expenditures/net income]	20.21%	2.22%	63.38%	0.09%	13.46%	0.00%	470.64%
ΔNon-operating activity expenditures/total assets	0.01%	0.00%	1.17%	−0.09%	0.17%	−8.02%	4.59%
Non-revenue-generating expenditures	7,683	5,108	8,552	2,289	9,532	278	42,593
ΔNon-revenue-generating expenditures	472	174	1,534	−95	747	−4,357	7,409
Absolute value [ΔNon-revenue-generating expenditures/net income]	36.36%	11.42%	82.60%	3.88%	31.43%	0.14%	626.64%
ΔNon-revenue-generating expenditures/total assets	0.23%	0.14%	1.65%	−0.43%	0.86%	−6.14%	5.34%
Total operating expenditures	64,216	45,743	61,168	23,261	84,122	2,939	326,905
ΔTotal operating expenditures	4,813	2,554	8,979	4,848	67,177	−17,593	77,558
Daily hospital service expenditures	19,871	14,190	18,178	6,915	25,897	385	90,981
Ambulatory service expenditures	7,643	4,492	9,627	2,422	8,820	0	61,687
Ancillary service expenditures	36,474	24,289	35,341	12,182	48,701	1,445	194,592
Gain on sale of property	94	0	482	0	10	0	4,250
Absolute value [gain on sale of property/net income]	1.89%	0.00%	8.82%	0.00%	0.35%	0.00%	66.10%
Gain on sale of property/total assets	0.06%	0.00%	0.27%	0.00%	0.01%	0.00%	2.24%

(continued on next page)

TABLE 1 (continued)

Panel B: Pearson Correlation for 432 California Nonprofit Hospital Years (1998–2003) with Available Data

	ΔNon-Operating Activity Expenditures	ΔNon-Revenue-Generating Expenditures	ΔNon-Operating Activity Plus Non-Revenue-Generating Expenditures	ΔTotal Operating Expenditures
ΔNon-revenue-generating expenditures	0.387			
p-value	(< 0.001)			
ΔNon-operating activity plus Non-revenue-generating expenditures	0.983	0.210		
p-value	(< 0.001)	(< 0.001)		
ΔTotal operating expenditures	0.898	0.243	0.903	
p-value	(< 0.001)	(< 0.001)	(< 0.001)	
Gain on sale of property	0.172	−0.017	0.186	0.189
p-value	(< 0.001)	(0.726)	(< 0.001)	(< 0.001)

Panel C: Frequency of Hospital Years by Income Level and Type of Expenditure

Hospital Type	Binary Variable	Non-Revenue-Generating Expenditures	Non-Operating Expenditures
Income above benchmark—predicted to decrease income by increasing expenditures	*Increase*	184	145
Income below benchmark—predicted to increase income by decreasing expenditures	*Decrease*	74	31
Income within benchmark—predicted to maintain expenditures	*Baseline*	112	117
Income far below benchmark—no prediction	*Nopred*	62	98
Total		432	391

All variables winsorized at the 1 percent and 99 percent levels.

revenue-generating, and operating expenditures are significantly correlated, suggesting that real earnings management is likely to occur in more than one area.

Net Income as a Benchmark

Our hypotheses concern managerial decisions about expenditure levels that impact performance relative to a benchmark, making it crucial to identify that benchmark. Because nonprofit hospitals are not publicly traded, typical benchmarks such as analyst forecasts are unavailable. However, prior research documents a discontinuity around 0 earnings (Hayn 1995; Burgstahler and Dichev 1997; Degeorge et al. 1999; Jacob and Jorgensen 2007), which is interpreted as evidence of earnings management by firms to meet earnings benchmarks, although others claim the discontinuity is an artifact of the data (see Durtschi and Easton 2005).[6] We use zero net income as the benchmark that nonprofit hospitals want to meet. By contrast, Leone and Van Horn (2005) use zero operating income as the benchmark.[7] They focus on accruals management, which would primarily impact accounts associated with revenue-generating activities and would be reflected in operating income. We explore the effects of non-operating and non-revenue-generating activity expenditures, so our benchmark is net income. To identify firms that just meet zero earnings, we group firm-years into intervals based on net income divided by total assets at the beginning of the year. Then, following Degeorge et al. (1999), we construct categories of scaled earnings for widths of 0.04.[8] We identify firms that just meet zero earnings by concentrating on hospital-years in the interval to the immediate right of zero.

Tests of H1a, H1b, and H2a

H1a, H1b, and H2a focus on the use of activity expenditures to manage earnings, either upward (H1a and H1b) or downward (H2a) to reach a benchmark. First we calculate net income before spending for the category of interest (i.e., non-operating, operating, or non-revenue-generating activity). We then calculate the "projected income" by adding back the level of spending on the category of interest in year *t*–1. Therefore, projected income is net income if the firm had spent the same amount on the category of interest as in year *t*–1. We then examine whether projected income is above, below, far below, or within the benchmark range.[9] We classify a firm as being within the benchmark range if net income deflated by lagged assets is in the interval [0.0, 0.04), which represents bins 0 and 1. We classify firms as "far below" if their projected income is below zero by more than the expenditure level in *t*–1. These firms cannot reach the benchmark by managing expenditures in that specific category of interest.

Hospitals with projected income below the benchmark range have incentives to increase income to achieve the benchmark range. Thus, for H1a and H1b, we expect managers to decrease expenditures relative to the prior period so that actual net income is more positive than projected income.[10] Hospitals with projected income above the benchmark range, however, have incentives to reduce actual income to avoid additional scrutiny. We expect these managers to increase expenditures relative to the prior period (H2a). For hospitals with projected income within the benchmark range, we expect no change in expenditure levels relative to the prior year. We have no directional prediction for hospitals with adjusted income that is far below the benchmark. In addition to maintaining expenditure levels similar to the prior year, managers of these hospitals might either (1) decrease expenditures to move closer to the benchmark range, even though they cannot achieve the benchmark, or (2) shift future expenditures, such as replacing or disposing of old equipment used in daily operations, to the current period so that they have a better chance of achieving the benchmark in the next period (i.e., take a "bath").

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[6] Durtschi and Easton (2005) provide evidence that the discontinuity around zero earnings can be caused by the deflator because it is significantly smaller for firms just below zero than at zero. For our sample of nonprofit hospitals, total assets are not significantly different between firms just below zero (81.46M) and firms at or just above zero (74.22M).

[7] They note, however, that net income would be a defensible alternative benchmark and tests using income-after-non-operating adjustments provide similar results as do their tests using operating income.

[8] Degeorge et al. (1999) determine bin widths based upon $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range and n is the number of available observations. In addition, as a robustness check, we also use smaller bin widths (both 0.02 and 0.03) and find qualitatively similar results (untabulated).

[9] To examine whether managers have changed expenditures from expected levels, we need an expectations model. While the level of non-operating and non-revenue-generating expenditures are discretionary, for many of these activities operations require a minimum expenditure level. Operating departments have a substantial amount of fixed costs, so they also require a minimum expenditure level.

[10] For the non-operating expenditure sample, of the firms with incentives to increase/decrease, 23 percent actually meet the benchmark (15 percent of hospitals with incentives to decrease; 23 percent of hospitals with incentives to increase). For the non-revenue-generating expenditure sample, of the firms with incentives to increase/decrease, 22 percent actually meet the benchmark (6 percent of hospitals with incentives to decrease; 28 percent of hospitals with incentives to increase).

Table 1, Panel C, provides information about the frequency of hospital year observations by income level and type of expenditure. For total non-revenue-generating expenditures, of the 432 available observations, 184 have income above benchmark and based upon H2a, are predicted to increase expenditures relative to the prior year. Seventy-four have income below benchmark and based upon H1a, are predicted to decrease expenditures relative to the prior year. One hundred twelve observations have income within the benchmark and are expected to maintain expenditure levels. We make no predictions for the remaining 62 observations. For non-operating expenditures, of the 391 available observations, 145 are predicted to increase expenditures, 31 are predicted to decrease expenditures, 117 are expected to maintain expenditure levels, and we make no predictions for the remaining 98 observations. Our empirical models employ indicator variables for the categories of hospital years that we expect a relative increase or decrease in expenditures (*Increase* and *Decrease*, respectively), or where we have no prediction (*Nopred*). Hospital years for which we expect no change in expenditure levels from the prior year serve as the base.

We perform multivariate regressions with changes in expenditures for total non-operating, operating, and non-revenue-generating activity (expenditures in period t minus expenditures in period t–1) as dependent variables. As described above, our primary independent variables of interest are indicator variables reflecting our predictions. Our analysis is based upon the following model (1):[11]

$$\Delta Expend_{it} = a_0 + \beta_1 Decrease_{it} + \beta_2 Increase_{it} + \beta_3 Nopred_{it} + \beta_4 LogAsset_{it} + \beta_5 \Delta Sales_{it} + \Sigma_{j=1}^{5} \beta_{5+j} YEAR_j + \varepsilon_{it}, \quad (1)$$

where:

$\Delta Expend$ = change in non-operating or non-revenue-generating activity expenditure from t–1 to t, deflated by assets;
$Decrease$ = 1 if projected income is below benchmark range by an amount less than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
$Increase$ = 1 if projected income is above benchmark range, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
$Nopred$ = 1 if projected income is below benchmark range by an amount greater than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
$LogAsset$ = log of total assets;
$\Delta Sales$ = change in sales from t–1 to t, deflated by assets; and
$YEAR$ = 1 if observation is in year j of the sample, 0 otherwise.

We use *LogAsset* to control for size and *ΔSales* to control for changes related to ordinary operations. We employ gross charges as a measure of sales to best reflect hospitals' use of resources to provide patient care. Net reimbursement would ignore changes in charity care and changes in resources used under capitation contracts.[12] Given the model structure, the variables *Decrease*, *Increase*, and *Nopred* reflect incremental differences from the base firm hospitals that we expect to have the same expenditure levels as the prior year.

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[11] The model is estimated via OLS, using Roger's robust standard errors and year indicators to control for hospital and year clustering (Gow et al. 2010; Petersen 2009).

Tests of H3a

Our model development thus far has not considered managers' pay-for-performance incentives. H3a predicts that, regardless of proximity to the earnings benchmark, managers with positive P4P incentives will decrease expenditures (with the exception of daily hospital services). To incorporate performance-based compensation incentives into our model, we first estimate a hospital-level measure of P4P. To control for size effects, we follow the general model outlined in Sloan (1993), where change in the log of pay is a function of the change in return-on-assets. Because our compensation measure reflects the top administrative team, we scale by the number of full-time equivalents (FTEs) in the department to reflect the pay level of individuals in the team.[13] Accordingly, we estimate the equation as:

$$\Delta Log[Total\ Compensation_t/FTE_t] = \eta_0 + \eta_1 \Delta ROA_t + \eta_2 HHindex_t + \eta_3 StdROA_t + \varepsilon_t. \qquad (2)$$

Total Compensation is the annual sum of direct salaries, bonuses, and benefits of the top hospital administrators, which include the CEO, Medical Director, Nursing Director, and their assistants.[14] We analyze top management pay because these individuals work together to guide hospital operations.[15] *FTE* is the number of full-time equivalent employees in hospital administration. *ΔROA* is the sum of operating and non-operating income, deflated by assets for year *t* minus the sum of operating and non-operating income deflated by assets for year *t*−1. In addition, we augment the Sloan (1993) model to include two variables that influence the relationship between pay and performance.[16] *HHindex* is the Herfindahl-Hirshman Index calculated based on the number of beds in the Metropolitan Statistical Area in which the hospital resides (Lambert and Larcker 1995; Balakrishnan et al. 2010). We control for competition because hospitals in more competitive metropolitan areas have greater incentives to motivate their managers to operate efficiently to sustain economic viability.[17] *StdROA* is the standard deviation of ROA over three years and is included because pay can be influenced by earnings volatility (Sloan 1993; Shaw and Zhang 2010).[18] We estimate Equation (2) at the hospital level, over the period 1995–2003. The coefficient η_1 provides our firm-specific measure of pay-performance sensitivity, *P4P*.

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[12] As an alternative measure to control for changes in operations, we use Adjusted Patient Days. This industry standard measure is inpatient days adjusted for outpatient volume. Results are similar using this alternative control variable.

[13] To validate this compensation variable, we analyze CEO pay from IRS Form 990s for 39 hospitals with available data. We compare the Form 990 figures to our variable of total pay for the top administrative team. Over the period 2003 to 2009, the correlation is 0.7484 ($p < 0.01$). The Pearson correlation for 2003, the year that overlaps our sample period, is 0.7208 ($p < 0.01$). These correlations increase our confidence in this proxy.

[14] Our dataset does not include compensation details for each administrator. A similar dataset is used in Lambert and Larcker (1995), Eldenburg and Krishnan (2008), and Eldenburg et al. (2009).

[15] Lambert and Larcker (1995) use proprietary data and find compensation for the CEO is similar in structure to compensation for the top five hospital administrators.

[16] Our results are robust when we estimate Equation (2) without the additional control variables (i.e., change in compensation regressed on change in *ROA*).

[17] Lambert and Larcker (1995) suggest there is an optimal trade-off between incentive compensation and other disciplinary devices to induce appropriate action from the management. They discuss three motivational devices: market competition, regulation, and monitoring by the board. Because we use data from one state, regulation should not vary across our sample. As a robustness check for monitoring, we include an indicator variable for whether the hospital has governing board expense. The results are similar. We do not include this variable in the final model because governing board expense is zero for 80 percent of hospitals.

[18] We use the standard deviation of *ROA*. Our results are robust if we use the standard deviation of net income instead.

Of the total 179 hospitals with data, 84 (or 47 percent) have a negative η_1. Unlike for-profit hospitals, profit is not necessarily the primary objective for hospital managers, so hospitals must strike a balance between social objectives and profit objectives. The importance of profits is thus likely to vary widely by hospital and include a negative relation between pay and financial performance. For example, if a hospital values charity care, then each charity patient contributes positively to that objective, but negatively affects financial performance. Because nonfinancial objectives vary widely across hospitals and are difficult to measure, we use pay-for-performance incentives to help discriminate earnings management from appropriate operational decisions, limiting our sample to the 95 hospitals with a positive relation between pay and performance.

Table 1 presents descriptive statistics for *P4P*. The coefficient ranges from 0.070 to 27.17, with a mean of 3.76. Overall, untabulated analysis reveals that the coefficient on ΔROA is significantly different from zero using the Fama and MacBeth (1973) approach that calculates the standard error of the mean of coefficients across hospitals. The mean value of the coefficient across hospitals is 3.76 ($p < 0.01$). 27.4 percent of the coefficients on ΔROA are significantly different from zero and the mean R^2 across hospitals is 0.47.

We incorporate pay-for-performance into Equation (1) as follows:

$$\begin{aligned}\Delta Expend_{it} = {} & a_0 + \beta_1 Decrease_{it} + \beta_2 Increase_{it} + \beta_3 Nopred_{it} + \beta_4 P4P_i + \beta_5 Decrease_{it} * P4P_i \\ & + \beta_6 Increase_{it} * P4P_i + \beta_7 Nopred_{it} * P4P_i + \beta_8 LogAsset_{it} + \beta_9 \Delta Sales_{it} \\ & + \Sigma_{j=1}^{5} \beta_{9+j} YEAR_j + \varepsilon_{it}. \qquad (3)\end{aligned}$$

We predict a positive sign for β_2 and negative signs for β_1, β_4, β_5, and β_6.

Table 2 presents results from estimating Equation (3) for non-operating and non-revenue-generating expenditures. The intercept represents the change in expenditure for hospitals within the target range (based on last year's spending) and without pay-for-performance incentives. The intercept is insignificant for all samples presented in Table 2. The first column contains estimates with aggregate change in total non-operating *and* non-revenue-generating activities as the dependent variable. The coefficient estimate on the decrease indicator variable is –0.010 and is marginally significant ($p = 0.08$). The coefficient estimate on the increase indicator variable is 0.005 and is also marginally significant ($p = 0.10$). Consistent with H1a, hospitals that could reach the benchmark range by decreasing (increasing) expenditures have changes in these expenditures that are more negative (positive) than the other sample hospitals. The coefficient on *P4P* is negative and significant ($p = 0.06$) suggesting that managers are more likely to decrease non-operating and non-revenue-generating expenditures when *P4P* incentives are high. The coefficient on *Decrease * P4P* is negative, although not significant ($p = 0.18$). Consistent with H3a, the coefficient on *Increase * P4P* is negative and marginally significant ($\beta_6 = -0.00122$, $p = 0.10$) suggesting that these incentives appear to moderate the tendency for managers to decrease income when it is high. The coefficient on *Nopred* is positive and marginally significant ($\beta_3 = 0.010$, $p = 0.10$) indicating that those nonprofit hospitals that cannot possibly reach the benchmark tend to increase expenditures, consistent with "taking a bath."

The second column documents estimates using change in total non-operating expenditures (net of losses on asset dispositions) as the dependent variable. The evidence is consistent with both H1a and H1b. Hospitals that could achieve the benchmark range by decreasing (increasing) expenditures have changes in these expenditures that are significantly more negative (positive) than the other hospitals. The coefficient estimate on the decrease indicator variable is negative (–0.027) and significant ($p = 0.08$) and the coefficient estimate on the increase indicator variable is positive (0.007) and significant ($p = 0.02$), providing support for H1a and H2a. The coefficient on *Decrease * P4P* is not significant, so pay-for-performance incentives alone do not appear to result in further decreases in non-operating expenditures ($\beta_5 = 0.00196$, $p = 0.17$). The coefficient on *Increase **

TABLE 2

OLS Regression of Change in Expenditures on Earnings and Pay-for-Performance Incentives for Non-Operating and Non-Revenue-Generating Activities

Variable	Pred.	Dep. Variable: Non-Operating and Non-Revenue-Generating $\Delta NOCC_t + \Delta EXP_t$	Dep. Variable: Non-Operating Expenditures $\Delta NOCC_t$	Dep. Variable: Non-Revenue-Generating Expenditures ΔEXP_t
Intercept		0.009	−0.013	−0.002
		(0.660)	(0.438)	(0.896)
$Decrease_t$	−	−0.010	−0.027	−0.052
		(0.081)*	(0.077)*	(0.011)**
$Increase_t$	+	0.005	0.007	0.003
		(0.095)*	(0.023)**	(0.142)
$Nopred_t$		0.010	0.002	0.009
		(0.096)*	(0.507)	(0.021)**
P4P	−	−0.00037	0.00014	−0.00028
		(0.058)*	(0.196)	(0.020)**
$Decrease_t * P4P$	−	−0.00151	0.00196	−0.00235
		(0.182)	(0.170)	(0.056)*
$Increase_t * P4P$	−	−0.00122	−0.00183	−0.00132
		(0.100)*	(0.019)**	(0.057)*
$Nopred_t * P4P$		−0.00051	−0.00180	−0.00051
		(0.364)	(0.099)*	(0.263)
$LogAsset_t$		−0.005	0.008	−0.006
		(0.805)	(0.371)	(0.761)
$\Delta Sales_t$		0.000	0.001	0.001
		(0.955)	(0.389)	(0.494)
Year indicators		Yes	Yes	Yes
No. of Obs.		432	391	432
R^2		0.12	0.14	0.14

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*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively, one-tailed (two-tailed on *Nopred* and the control variables).

p-values in parentheses. The p-values are computed using Roger's robust standard errors correcting for hospital clustering. Hospitals for which the independent variable is zero in every year between 1998 and 2003 are deleted from the sample. All variables are winsorized at the 1 percent and 99 percent levels.

Variable Definitions:

$\Delta NOCC$ = change in non-operating cost center expenditures deflated by assets;

ΔEXP = change in non-revenue-producing expenditures (includes total research expenditures, total administrative services, total general services, and total education expenditures) deflated by assets;

Decrease = 1 if projected income is below benchmark range by an amount less than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;

Increase = 1 if projected income is above benchmark range, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;

Nopred = 1 if projected income is below benchmark range by an amount greater than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;

P4P = pay-for-performance sensitivity calculated from Equation (2);

LogAsset = natural log of total assets; and

$\Delta Sales$ = change in sales deflated by total assets.

P4P is negative and significant ($\beta_5 = -0.00183$, $p = 0.02$), however. Pay-for-performance incentives thus appear to result in further decreases in expenditures for hospitals with incentives to reduce income toward the benchmark.

The third column of Table 2 presents results for Equation (3) with non-revenue-generating expenditures as the dependent variable. Our measure of non-revenue-generating expenditures excludes fiscal services because this category includes components that are unlikely to be discretionary (such as patient accounting and admitting in fiscal services). Regression results provide further evidence to support H1a; the coefficient *Decrease* is negative and significant ($\beta_1 = -0.052$, $p = 0.01$). The coefficient on *Increase* is insignificant ($p = 0.14$). The coefficient on *P4P* is negative and significant, suggesting that managers are more likely to decrease non-revenue-generating expenditures when *P4P* incentives are high. The coefficient on the interaction of *P4P* with *Decrease* is significantly negative ($p = 0.06$), suggesting that these incentives exacerbate the tendency for managers to decrease expenditures when income is low. The coefficient on the interaction of *P4P* with *Increase* is also significantly negative ($p = 0.06$), suggesting that these incentives appear to mitigate the tendency for managers to increase expenditures when income is high, consistent with H3a. In addition, the coefficient on *Nopred* is positive and significant ($\beta_3 = 0.009$, $p = 0.02$). These findings provide further evidence that firms with projected incomes far below benchmark range shift future "other operating" expenditures to the current period so that they have a better chance of achieving the benchmark in the next period (i.e., take a "bath").[19]

Table 3 presents results of estimating Equation (3) for operating expenditures. The first column contains results for total operating expenditures, and the following three columns present results for expenditures on daily hospital services, ambulatory services, and ancillary services. H1b predicts that real earnings management for hospitals that have incentives to manage earnings upward will be less prevalent for daily hospital services (the core of the hospital's business). H2a does not differentiate among the types of operating expenditures because expenditure increases are unlikely to threaten the hospital's core operations. Results reported in the first column of Table 3 provide evidence that operating expenditures are not used to manage toward the benchmark. The coefficient on *Decrease* is 0.009 ($p = 0.37$) and the coefficient on *Increase* is 0.006 ($p = 0.41$). The coefficient on *Nopred* is positive and significant ($p < 0.01$).[20]

When we separate operating expenditures into daily hospital services, ambulatory services, and ancillary services, it appears that neither management of expenditures toward the benchmark nor response to pay-for-performance incentives occurs for daily hospital services. In the second column of Table 3, none of the coefficients are significantly different from zero in the predicted direction. In contrast, for ambulatory services (the third column of Table 3), we find a significantly negative coefficient on *Decrease* ($p < 0.01$). The incremental effect (relative to the base hospitals for which we expect no change in expenditure levels from the prior year) is negative, although the absolute effect is positive because the magnitude of the coefficient is less than the magnitude of the intercept.

The coefficient on *P4P* is significant and negative for ambulatory and ancillary services but not for daily hospital services. The coefficients on the interaction of *P4P* with *Decrease* and *Increase*

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[19] We also examine univariate changes in expenditures by incentive category (Increase, Decrease, No Prediction, and Maintain). The results (untabulated) are consistent with hospitals managing expenditures in the predicted direction and by amounts that are large enough to have a material effect on net income. For example, mean change non-operating activities as a percentage of the absolute value of net income is 5.1 percent, –44.0 percent, –0.46 percent, and 19.4 percent for the Increase, Decrease, No Prediction, and Maintain category, respectively. Unconditional mean changes for the non-operating activities, non-revenue-generating, and non-operating plus non-revenue-generating expenditures samples are negative for the Decrease hospitals and positive for the Increase hospitals.

[20] The coefficient of the interaction *Nopred* * *P4P* is missing for operating expenditures and ancillary services because there is only one hospital in that category.

TABLE 3

OLS Regression of Change in Operating Expenditures on Earnings and Pay-for-Performance Incentives

Variable	**Pred.**	**Dep. Variable: Operating Expenditures** ΔOP_t	**Dep. Variable: Daily Hospital Services Expenditures** ΔDHS_t	**Dep. Variable: Ambulatory Services Expenditures** ΔAMB_t	**Dep. Variable: Ancillary Services Expenditures** ΔANC_t
Intercept		0.233	0.049	0.081	0.099
		(0.025)**	(0.195)	(0.003)***	(0.136)
Decrease$_t$	–	0.009	0.013	−0.015	0.007
		(0.368)	(0.015)	(0.004)***	(0.288)
Increase$_t$	+	0.006	0.000	0.002	−0.005
		(0.409)	(0.454)	(0.228)	(0.231)
Nopred$_t$		0.258	0.041	0.008	0.024
		(0.001)***	(0.223)	(0.126)	(0.817)
P4P	–	0.00048	−0.00038	−0.00022	−0.00089
		(0.432)	(0.201)	(0.041)**	(0.031)**
Decrease$_t$ * *P4P*	–	−0.002	−0.001	0.002	0.001
		(0.329)	(0.175)	(0.031)	(0.304)
Increase$_t$ * *P4P*	–	−0.001	0.000	0.001	0.001
		(0.404)	(0.197)	(0.030)	(0.018)
Nopred$_t$ * *P4P*			−0.067	−0.001	
			(0.265)	(0.072)*	
LogAsset$_t$		−0.013	0.018	0.000	−0.006
		(0.887)	(0.545)	(0.984)	(0.912)
Δ*Sales*$_t$		−0.009	−0.001	−0.004	−0.003
		(0.101)	(0.486)	(0.007)***	(0.362)
Year indicators		Yes	Yes	Yes	Yes
No. of Obs.		432	432	432	432
R^2		0.07	0.09	0.10	0.06

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*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively, one-tailed (two-tailed on *Nopred* and the control variables).

p-values in parentheses. The p-values are computed using Roger's robust standard errors correcting for hospital clustering. Hospitals for which the independent variable is zero in every year between 1998 and 2003 are deleted from the sample. All variables are winsorized at the 1 percent and 99 percent levels.

Variable Definitions:
ΔOP = change in total operating expenditures (daily hospital, ambulatory, ancillary, and purchases) deflated by assets;
ΔDHS = change in daily hospital service expenditures deflated by assets;
ΔAMB = change in ambulatory service expenditures deflated by assets;
ΔANC = change in ancillary service expenditures deflated by assets;
Decrease = 1 if projected income is below benchmark range by an amount less than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
Increase = 1 if projected income is above benchmark range, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
Nopred = 1 if projected income is below benchmark range by an amount greater than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
P4P = pay-for-performance sensitivity calculated from Equation (2);
LogAsset = natural log of total assets; and
Δ*Sales* = change in sales deflated by total assets.

are not significant in the predicted direction. Overall, these results indicate no significant management of expenditures toward the benchmark within hospital operating categories, except for modest evidence in one area that is not central to hospital operations (i.e., ambulatory services). However, there is evidence of management of expenditures in ambulatory and ancillary services in response to *P4P* incentives.

Tests of H1c, H2b, and H3b

H1c, H2b, and H3b concern the use of fixed asset dispositions to manage earnings toward the net income benchmark. For all of the observations in our sample, asset dispositions resulted in net gains, so we examine the effects of gains on earnings. We expect hospitals with net income before asset dispositions ("pre-managed" income) that are below the net income benchmark range to increase net income by disposing of assets (H1c). Hospitals that are above the benchmark range might be less likely to report a gain on asset sales to minimize increases in net income from asset dispositions (H2b). Finally, hospitals' P4P incentives could moderate real earnings management incentives to decrease asset sales that would result in gains when hospitals are above the benchmark range (H3b).

Tests for these hypotheses differ somewhat from the approach used for the earlier hypotheses because, as Table 1 indicates, gains on the sale of property are relatively rare, so using prior year gains as a benchmark is impractical.[21] We also need to consider asset gains that would occur during the normal course of operations. Accordingly, we analyze gains on sale of property for hospitals with pre-managed income just above and below the benchmark range, relative to hospitals in bins 0 and 1. We expect that hospitals with pre-managed earnings just below the benchmark are more likely than are other hospitals to report gains on asset sales (H1c), hospitals with pre-managed income just above the benchmark are less likely to report gains on asset sales (H2b), and hospitals' P4P incentives moderate incentives to decrease asset sales when they are above the benchmark (H3b). To test these hypotheses, we use a logistic regression to model the relation between the likelihood of reporting a gain on property sales in the current year and a hospital's ability to meet or beat the current year's net income benchmark, based on pre-managed income. Our model follows:

$$\begin{aligned} Gain_{it} = {} & a_0 + \beta_1 BelowZero_{it} + \beta_2 AboveZero_{it} + \beta_3 P4P_i + \beta_4 BelowZero_{it} * P4P_i \\ & + \beta_5 AboveZero_{it} * P4P_i + \beta_6 \Delta Sales_{it} + \beta_7 ROA_{it} + \beta_8 PPE_{it-1} + \beta_9 LogAsset_{it} \\ & + \Sigma_{j=1}^{5} \beta_{9+j} YEAR_j + \varepsilon_{it}, \end{aligned} \tag{4}$$

where:

Gain = 1 if the hospital reports a net gain on the sale of property in year *t*, 0 otherwise;
BelowZero = 1 if pre-managed income/total assets is in a bin just to the left of the benchmark range, [−0.04, 0), 0 otherwise;
AboveZero = 1 if pre-managed income/total assets is in a bin just to the right of the benchmark range, [0.04, 0.08), 0 otherwise;
ROA = net income deflated by assets; and
PPE = property, plant, and equipment deflated by assets (excluding PPE); and other variables as defined above.
Other variables are defined previously.

We control for size (*logAsset*) and two measures of performance (*ΔSales, ROA*). Lagged property, plant, and equipment (PPE_{t-1}) accounts for the availability of assets for disposal, and year indicators control for year-specific effects. We define *BelowZero* as the bin width just to the left of 0 (i.e., in the interval [−0.04, 0.00)) and *AboveZero* as the bin width just to the right of 0 (i.e., in the interval [0.04, 0.08)). The analysis is limited to hospitals in the bin widths just around the benchmark to rule out alternative explanations for asset dispositions that would occur during the normal course of operations. The average reported gain as a percentage of the absolute value of net income is 1.74 percent (reported in Table 1), so reported gains should materially affect hospitals' ability to move closer to the benchmark. Since the conventional logit coefficients on interaction terms do not provide a valid statistical test, we compute the correct coefficient, marginal effect, and Z-statistic for our interaction terms, as suggested by Norton et al. (2004).

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[21] Note that we have no observations where the hospitals report a net loss on the sale of assets.

Table 4 presents these results. The coefficient on *BelowZero* is insignificant, failing to provide support for H1c. The coefficient on *AboveZero*, however, is negative and significant (−2.35; $p = 0.02$), providing support for H2b. The two coefficients differ significantly ($p = 0.06$). Accordingly, we find evidence that hospitals just above the benchmark range are less likely to report a gain than other hospitals. These firms could be forgoing higher levels of income to avoid scrutiny or saving asset sales for future boosts to income. Results for the pay-for-performance interaction terms indicate that hospitals with financial performance incentives and income above zero are more likely to report a gain, consistent with H3c. Results for control variables indicate that larger hospitals are more likely to report a gain. The coefficient on *ROA is* negative and significant ($p = 0.08$) indicating that hospitals are less likely to report a gain as performance increases. The coefficient on PPE_{t-1} is positive, but is not statistically significant.

Sensitivity Analysis

To examine the robustness of our results to our choice of the prior year's expenditures as the expected level of spending, we employ three alternative measures as the basis from which managers increase/decrease expenditures: (1) average of expenditures in years $t-1$ and $t-2$ and (2) expenditure for $t-1$ adjusted by changes in patient volume. The results (untabulated) using both alternative measures result in the same statistical conclusions as those reported in Tables 2 and 3.

A limitation of the earnings management literature is that the results could reflect an omitted variable or could be capturing behavior other than intentional manipulation such as good management. While we cannot definitively infer that we are observing opportunistic behavior, we can provide additional supportive evidence that managers are manipulating earnings rather than managing ongoing operations.

First, we focus only on hospitals with incentives to meet an earnings. If we observe a manager increasing (decreasing) a particular expenditure in the current period to reach an earnings benchmark, then we would expect that expenditure to decrease (increase) when the incentive to manage earnings is no longer present. If the observed behavior is unrelated to earnings management, i.e., a good manager taking advantage of cost savings, then we would expect no reversal in expenditures in the next period, on average.

Therefore, we examine expenditure changes in year $t+1$ for firms with incentives to manage earnings in t, but no incentives to manage earnings in $t+1$. We estimate Model (3) using non-operating and non-revenue-generating expenditures in $t+1$ as the dependent variable (i.e., the year after the firm is suspected of engaging in earnings management):

$$\begin{aligned}\Delta Expend_{it+1} = {} & a_0 + \beta_1 Decrease_{it} + \beta_2 Increase_{it} + \beta_3 Nopred_{it} + \beta_4 P4P_i + \beta_5 Decrease_{it} \\ & * P4P_i + \beta_6 Increase_{it} * P4P_i + \beta_7 Nopred_{it} * P4P_i + \beta_8 LogAsset_{it+1} \\ & + \beta_9 \Delta Sales_{it+1} + \Sigma_{j=1}^{5} \beta_{9+j} YEAR_j + \varepsilon_{it}, \end{aligned} \tag{3a}$$

where all variables are as previously defined.

TABLE 4

Logit Regression of Gain on Asset Sales on Earnings and Pay-for-Performance Incentives

Variable	Pred.	Coefficient	Z-Statistic	Marginal Effects
Intercept		−6.083	−2.69***	
BelowZero	+	−0.376	−0.90	−0.08
AboveZero	−	−1.639	−2.35**	−0.26
P4P	+	0.001	0.07	0.0003
*BelowZero * P4P*	+	−0.001	−0.01	−0.0001
*AboveZero * P4P*	+	0.219	1.95*	0.048
$\Delta Sales_t$		−0.472	−0.54	−0.103
ROA_t		−1.855	−1.76*	−0.403
PPE_{t-1}		0.003	1.28	0.001
$LogAsset_t$		0.304	2.48**	0.066
p-value for the test:				
BelowZero = *AboveZero*		0.055		
Year indicators		Yes		
# with Sale		129		
# without Sale		260		
Model Chi-squared		27.92		
% concordant pairs (+ tied)		65.4		

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*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively, two-tailed.
All variables are winsorized at the 1 percent and 99 percent levels. The Ai and Norton marginal effects and Z-statistics on the interaction term are calculated following Norton et al. (2004).

Variable Definitions:
Gain = 1 if the hospital reports a net gain on the sale of property in year *t*, 0 otherwise;
BelowZero = 1 if pre-managed income/total assets is in a bin just to the left of the benchmark range, [−0.04, 0), 0 otherwise;
AboveZero = 1 if pre-managed income/total assets is in a bin just to the right of the benchmark range, [0.04, 0.08), 0 otherwise;
ΔSales = change in operating revenue deflated by total assets;
ROA = net income divided by total assets;
PPE = lagged property, plant, and equipment deflated by lagged assets (excluding lagged property, plant, and equipment); and
LogAsset = natural log of total assets.

Results in Table 5 for aggregate non-operating and non-revenue-generating expenditures (column 1) provide evidence that if a hospital had an earnings management incentive to decrease non-operating expenses in year *t* and no earnings management incentive in *t*+1, then the decrease reverses in year *t*+1 (coefficient on *Decrease* = 0.006, p = 0.09). For non-operating expenditures, hospitals with incentives to increase expenditures in year *t* and no incentive in *t*+1 experience reverses of the increase in year *t*+1 (coefficient on *Increase* = −0.005, p = 0.05). For non-revenue-generating expenditures, the decrease reverses in year *t*+1 (the coefficient on *Decrease* = 0.004, p = 0.10). Recall that results in Table 2 provided evidence that managers are more likely to decrease non-revenue-generating expenditures when P4P incentives are stronger (a negative and significant coefficient). Table 5 reveals that this incremental decrease reverses and the coefficient on *P4P* is positive and significant. In addition, Table 2 also indicated that managers with stronger pay-for-performance compensation tend to decrease non-revenue-generating expenditures significantly

TABLE 5

OLS Regression of One-Period-Ahead Change in Expenditures on Earnings and Pay-for-Performance Incentives for Non-Operating and Non-Revenue-Generating Activities for Nonprofit Hospitals with No Earnings Management Incentives in $t+1$

Variable	Pred.	Dep. Variable: $\Delta NOCC_t + \Delta EXP_t$	Dep. Variable: $\Delta NOCC_t$	Dep. Variable: ΔEXP_t
Intercept		0.044	−0.003	0.038
		(0.205)	(0.714)	(0.192)
$Decrease_t$	+	0.006	−0.001	0.004
		(0.090)**	(0.330)	(0.095)**
$Increase_t$	−	−0.001	−0.005	0.006
		(0.446)	(0.045)**	(0.104)
$Nopred_t$		0.012	−0.001	0.009
		(0.079)*	(0.784)	(0.067)*
$P4P$	+	0.187	−0.012	0.118
		(0.074)*	(0.256)	(0.064)*
$Decrease_t * P4P$	+	0.084	0.055	0.114
		(0.263)	(0.046)**	(0.093)*
$Increase_t * P4P$	+	−0.426	0.027	−0.374
		(0.022)	(0.262)	(0.002)
$Nopred_t * P4P$		−0.248	0.008	−0.296
		(0.336)	(0.785)	(0.185)
$LogAsset_t$		−0.021	−0.007	−0.001
		(0.128)	(0.218)	(0.937)
$\Delta Sales_t$		−0.002	0.000	−0.002
		(0.211)	(0.418)	(0.164)
Year indicators		Yes	Yes	Yes
No. of Obs.		155	214	157
R^2		0.16	0.07	0.17

*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively, one-tailed (two-tailed on *Nopred* and the control variables).

p-values in parentheses. The p-values are computed using Roger's robust standard errors correcting for hospital clustering. Hospitals for which the independent variable is zero in every year between 1998 and 2003 are deleted from the sample. All variables are winsorized at the 1 percent and 99 percent levels.

Variable Definitions:
$\Delta NOCC$ = change in non-operating cost center expenditures deflated by assets;
ΔEXP = change in non-revenue-producing expenditures (includes total research expenditures, total administrative services, total general services, and total education expenditures) deflated by assets;
Decrease = 1 if projected income is below benchmark range by an amount less than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
Increase = 1 if projected income is above benchmark range, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
Nopred = 1 if projected income is below benchmark range by an amount greater than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;
P4P = pay-for-performance sensitivity calculated from Equation (2);
LogAsset = natural log of total assets; and
$\Delta Sales$ = change in sales deflated by total assets.

more than others. However, the reversal regression shows that the incremental decrease reverses in $t+1$ (coefficient on *Decrease* * *P4P* $= 0.114$, $p = 0.09$). Overall, Table 5 provides evidence that the observed behavior with respect to expenditures is due to earnings management rather than alternative explanations such as operations management.[22]

To further differentiate between opportunistic behavior and good operations management, we examine the relation between management in period t and future income (deflated by assets) in period $t+1$, $t+2$, and $t+3$. We focus on hospitals that were within the benchmark because the incentives are most clearly delimited for these groups. If managers with stronger pay-for-performance compensation tend to increase (decrease) a particular expenditure for opportunistic reasons, we would expect future performance to be affected negatively. However, if the observed behavior is unrelated to opportunistic earnings management, then we would not expect such an association. The first three columns of Table 6 present the results based on incentives to increase/decrease the sum of non-operating and non-revenue-generating expenditures. The last three columns of Table 6 present results based on incentives to increase/decrease operating expenditures. These tests serve as a benchmark, insofar as we expect (and find) less management of expenditures for operating expenditures. The results in Table 6 provide weak evidence consistent with opportunism rather than good management. For non-operating and non-revenue-generating expenditures, the coefficients on the two interaction terms (*Decrease* * *P4P*, *Increase* * *P4P*) are significantly negative when ROA_{t+3} is the dependent variable. We do not, however, find similar results for operating expenditures.[23]

We also perform a sensitivity test for our analysis of asset dispositions. Table 4 provides evidence that hospitals above the benchmark range are less likely to dispose of assets than are other hospitals. To control for performance effects, we limit the sample to three bin widths: just to the left of 0, just to the right of 0, and 0. These hospitals should have similar reasons to dispose of assets except for their positions relative to the benchmark range. The coefficient (untabulated) on *BelowZero* is insignificant, and the coefficient on *AboveZero* is negative and significant ($p < 0.01$), consistent with H2b.

As an additional sensitivity test, we split the *Increase* variable into two categories: (1) *JustAboveZero*, which equals 1 if net income before spending on a particular expenditure is greater than or equal to 0.04, but net income after spending on a particular expenditure (based on last year) is greater than or equal to 0.04 but less than 0.08, and (2) *FarAboveZero*, which equals 1 if net income before spending on a particular expenditure is greater than or equal to 0.04, but net income after spending on a particular expenditure (based on last year) is greater than or equal to 0.08. We find that hospitals in these two categories are not significantly different. For example, in Table 2, for the non-operating plus non-revenue-generating sample (column 1), the t-test for a difference between *JustAboveZero* and *FarAboveZero* is insignificant (p-value $= 0.83$) and the t-tests results find no significant (p-value $= 0.93$) difference between *JustAboveZero* * *P4P* and *FarAboveZero* * *P4P*. The differences are also insignificant for the non-operating (column 2) and non-revenue-generating (column 3) samples. We also separate *Increase* into two categories based on several other cutoffs for net income, specifically after spending on a particular expenditure is greater than or equal to bins 0.10, 0.12, and 0.14. The differences are not significant for any of the categories.

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[22] In the analysis of operating expenditures for ambulatory services (the third column of Table 3), we find a significantly negative coefficient on *Decrease* ($p < 0.01$). However, we find no evidence of expenditure reversal in $t+1$, which is inconsistent with earnings management (untabulated).

[23] We perform the analysis in Table 6 using a measure of operating efficiency (i.e., occupancy rates) as the dependent variable. For non-operating and non-revenue-generating expenditures, the coefficient on the interaction term (*Decrease* * *P4P*) is significantly negative in $t+1$ and $t+2$. We do not find similar results for operating expenditures. The results provide some evidence that real activities manipulation leads to lower operating efficiency.

TABLE 6

Future Performance Regressions

OLS Regression of Future Performance on Earnings and Pay-for-Performance Incentives

		Incentives Based on Non-Operating Plus Non-Revenue-Generating Expenditures			Incentives Based on Operating Expenditures		
Variable	**Pred.**	ROA_{t+1}	ROA_{t+2}	ROA_{t+3}	ROA_{t+1}	ROA_{t+2}	ROA_{t+3}
Intercept		0.017	0.027	0.024	0.016	0.030	0.032
		(0.211)	(0.070)*	(0.249)	(0.303)	(0.185)	(0.258)
$Decrease_t$	–	−0.029	−0.024	0.002	−0.017	−0.010	−0.016
		(0.249)	(0.254)	(0.948)	(0.608)	(0.645)	(0.611)
$Increase_t$	+	0.052	0.042	0.048	0.006	0.005	0.003
		(0.001)***	(0.058)*	(0.072)*	(0.719)	(0.798)	(0.906)
$Nopred_t$		−0.049	−0.006	−0.028	−0.239	0.144	0.148
		(0.296)	(0.881)	(0.584)	(< 0.001)***	(0.003)***	(0.026)***
$P4P$	–	0.001	0.002	0.002	0.000	0.001	0.001
		(0.295)	(0.359)	(0.631)	(0.861)	(0.713)	(0.841)
$Decrease_t * P4P$	–	0.002	0.001	−0.009	0.003	0.000	−0.005
		(0.265)	(0.367)	(0.050)**	(0.196)	(0.433)	(0.153)
$Increase_t * P4P$	–	0.000	0.000	−0.006	0.002	0.001	−0.004
		(0.459)	(0.457)	(0.074)*	(0.152)	(0.387)	(0.226)
$Nopred_t * P4P$		0.003	−0.003	−0.001	0.853	−0.068	0.140
		(0.542)	(0.516)	(0.844)	(0.001)***	(0.669)	(0.407)
ROA_t		0.433	0.343	0.356	0.679	0.505	0.576
		(0.001)***	(0.017)**	(0.031)**	(< 0.001)***	(< 0.001)***	(< 0.001)***
Year indicators		Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.		334	334	334	334	334	334
R^2		0.45	0.28	0.22	0.46	0.27	0.24

*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively, two-tailed (one-tailed on the interaction terms *Decrease* * *P4P* and *Increase* * *P4P*).

p-values in parentheses. The p-values are computed using Roger's robust standard errors correcting for hospital clustering. Hospitals for which the independent variable is zero in every year between 1998 and 2003 are deleted from the sample. All variables are winsorized at the 1 percent and 99 percent levels.

Variable Definitions:

Decrease = 1 if projected income is below benchmark range by an amount less than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;

Increase = 1 if projected income is above benchmark range, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;

Nopred = 1 if projected income is below benchmark range by an amount greater than prior year expenditure in the category, with benchmark range equal to income/total assets ([0, 0.04)), 0 otherwise;

P4P = pay-for-performance sensitivity calculated from Equation (2); and

ROA = net income divided by total assets.

IV. DISCUSSION AND CONCLUSIONS

Managers of both for-profit and nonprofit organizations have incentives to avoid negative net income because of contractual and reputation pressures. However, in nonprofit hospital settings, managers also have greater incentives to avoid high levels of net income to decrease the probability of scrutiny by government and other stakeholders. We first investigate whether nonprofit hospital managers change real activities to manage net income toward a benchmark of zero. Focusing on hospitals with "projected" incomes within a narrow band around zero net income, we find evidence consistent with management of expenditures associated with non-operating and non-revenue-generating activities to achieve positive income and with management of asset dispositions to avoid large positive net incomes. Second, we include the effects of pay-for-performance incentives in our analyses. We find that hospitals with stronger incentives to manage earnings upward experience significantly larger reductions in expenditures in non-revenue-generating and non-operating activities. Third, we provide analysis to discriminate between earnings management and good operational decisions by examining reversals in the suspect expenditures in the following period and future performance. Our evidence is weakly consistent with the use of real operating decisions to manage earnings.

This study is subject to several limitations. Our analysis requires assumptions about benchmark thresholds for levels of net income that would lie within benchmark range. However, without access to explicit contracts, our bin widths are subject to measurement error. This type of error is likely to work against our results. Another limitation is that we cannot completely distinguish between good management practices and decisions made specifically to manage earnings. However we provide analysis to help distinguish between these alternatives. Although we examine California hospitals, the results should generalize to nonprofit hospitals across the United States. While state regulations vary from state to state, rate-setting regulation that limits profits is no longer used in most states (although a few states continue to monitor and regulate hospital expansion and closure plans; Tieman and Fong 2003).

Understanding the incentives faced by nonprofit organizations is important for several reasons. First, if pressure to maintain tax-exempt status or to avoid low net income creates incentives for managers to engage in value-decreasing activities (e.g., overspending on governing board meetings) or activities that do not maximize community benefit (e.g., under-spending on public relations and education), then stakeholders (taxpayers and members of the organization's community) will suffer. Second, to the extent that tax exemption is a tool that can be used to accomplish governmental purposes, regulators should be interested in the indirect costs associated with pressure on nonprofit organizations to minimize profits. Third, stakeholders of nonprofits need information about financial condition and performance to make informed regulatory, contracting, donation, and investing decisions. Inefficient resource allocation can result from decisions based on financial information that has been altered by real activity manipulations.

We contribute to the accounting literature on real activities manipulation by considering the effects on real activities stemming from compensation incentives. Earlier studies focused primarily on use of accruals or opportunistic reductions in research and development expense to manage earnings. Because of the rich dataset from public disclosure requirements for California hospitals, we are not limited to a particular expenditure category and are able to analyze several different activities. Because hospitals can choose to engage in accruals management that could either complement or substitute for real activity management, future research could examine the relation between accruals and real activity management.

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On Testing Business Models

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ABSTRACT: This study explores decisions related to formal empirical tests of business models and interpretations and uses of those tests. Business models describe managers' rationales as to how their organizations will achieve success. This study documents a test of one company's business model under seemingly favorable conditions for such a test—a successful single-product firm following a consistent strategy over a long period of time with stable management and publicly traded stock. Although the findings provide only weak support for the hypothesized business model, the confidence of the company's top managers in their business model remained high. Further analyses reveal that the managers' response to the test results is consistent with that expected of Bayesian-rational agents. Our analyses provide the basis for development of a framework for understanding the expected value of testing business models in various circumstances. This framework might explain apparent contradictions between previous studies containing normative statements regarding the value of testing business models.

Keywords: *performance measurement; nonfinancial performance measures; business models; management control.*

Data Availability: *The data used in this study are derived from a proprietary dataset and public sources.*

I. INTRODUCTION

It is now well understood that financial performance measures are backward-looking and short-term oriented (e.g., Kothari and Sloan 1992). For management control purposes, therefore, it is important to supplement summary financial measures of performance, such as

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net income and return on assets, with some nonfinancial performance measures that provide more timely "leading" indications of success or failure (e.g., Kaplan and Norton 1996; Ittner and Larcker 1998a; Banker et al. 2000).

Both the multifactor measurement model (e.g., balanced scorecard) and value-based management literatures (e.g., Ittner and Larcker 2001) contend that a causal "business model" or a "strategy map" that articulates the economic logic of how an organization creates and delivers value should underlie every performance measurement system. A business model should explain how the important nonfinancial and financial variables in the performance measurement system are related to each other.

However, these models and the performance measurement systems derived from them might be based on erroneous *ex ante* hypotheses about cause-and-effect relationships. Hence, management accounting scholars contend that subjecting these models to formal empirical tests is critical (e.g., Ittner and Larcker 2003; Kaplan and Norton 2004, 2008). For example, Ittner and Larcker (2003, 91) argue that "if companies don't investigate whether there is a plausible causal relationship between actions and outcomes, they condemn themselves to measuring aspects of performance that don't matter very much." In general, these scholars contend that these tests can reveal whether the measures used to describe the firm's business model are associated with each other as expected, and whether, together, these variables lead to improved performance. The tests can also help managers identify circumstances that affect the strength of the relations among the measures (Dikolli and Sedatole 2007; Campbell et al. 2008). Based on a survey of 157 firms across different industries, Ittner and Larcker (2003) suggest that firms that consistently build and verify causal models have higher ROA than other firms.

Although the arguments for testing business models seem to be compelling, the causal assumptions embedded in companies' business models are almost never subjected to formal empirical tests (Nørreklit 2000, 2003; Ittner and Larcker 2003). Ittner and Larcker (2003) suggest that managers fail to do the needed testing because of laziness, thoughtlessness, and/or mendacity. Regarding this last idea, they assert, "Self-serving managers are able to choose—and manipulate—measures solely for the purpose of making themselves look good and earning nice bonuses" (Ittner and Larcker 2003, 89).

Conversely, we argue that there are rational and benign reasons for not subjecting business models to formal empirical testing. The insights we present emerge both from a critical review of the literature and our own experiences at a research site that provided us with a seemingly "clean setting" to conduct tests of the causal relationships underlying the business model of a company with a single operating unit. Our site, which we will refer to as Medical Test Inc. (MTI), is a publicly traded, medium-sized medical test equipment manufacturer that develops, manufactures, and markets test systems used by hospital and medical laboratories throughout most of the world. The company operates in a single line of business and has only one business model. Thus, the overall corporate performance measures are not distorted by shifts in cross-business sales mix. The company's top management has followed the same business model with considerable success for more than a decade. During the 12 years that MTI operated under this model, revenues grew at an annualized rate of 29 percent and annualized shareholder returns exceeded 40 percent.

We test the business model described by MTI's executives using proprietary data, monitored on a quarterly basis by the company's board of directors and top management over an eight-and-a-half-year period (first quarter of 1998–second quarter of 2006) and publicly available data from Compustat and CRSP. We use linear regressions to test whether the elements of the business model are, individually and collectively, leading indicators of both financial performance and shareholder returns. Additionally, we examine whether the structural path described in the business model is supported by the data. Despite the seemingly favorable conditions to test the business model and MTI's unequivocally successful track record, our results provide only weak support for the business model.

We presented our findings to management both as a check as to whether we had tested the model as they intended and to get their reactions to the results. The managers confirmed that we tested the model that they had described to us earlier. Interestingly, they were neither surprised nor disturbed by the general lack of validation of their company's business model. Furthermore, they remained confident that their business model was correct.

The managers' lack of concern for our results could reflect their own biases. However, our further explorations reveal that their reactions seem to be consistent with those of Bayesian-rational agents, for two reasons. First, the managers' confidence in their business model was built on more than a decade of experience with its implementation, and its considerable success. Second, the statistical tests are not powerful enough to provide conclusive evidence that the business model is not valid. The fact that the managers at MTI seek to implement rather than to test the business model leads them to take actions designed to keep the performance drivers at what they believe to be "optimal levels." These actions lead to a decrease in measurement variation and, consequently, to a decrease in the overall power of the analyses used to test the relationships embedded in the business model. Oftentimes, it also leads to taking corrective actions that are not reflected in the data. For these reasons, the managers were not surprised that the analyses of these data do not support their company's business model with statistical significance.

Over the course of our study, we learned lessons suggesting both how managers assess the value of testing their companies' business models and why so many managers do not conduct these tests. We propose that the expected value of testing a company's business model decreases with the managers' prior confidence in the model. If the managers assign a high probability to the premise that the business model is valid, then the expected benefits of the test decrease because managers will probably *not* expect results that would contradict the assumptions of the business model already in place. On the other hand, the expected costs of the test increase with the managers' confidence in the model because the managers should demand very powerful tests in order to take seriously any potential result that would not support their company's business model.[1] To increase the power of the statistical tests, the managers would need to induce, rather than dampen, variation in their actions. These variations would be perceived to be costly since they would require that the managers depart from pursuing what they consider to be "optimal levels" of performance drivers according to their business model. We propose that the managers' expected value of testing the business model will also depend on the data readily available from the firm's performance measurement system, the opportunity costs of implementing the business model, and the direct costs of conducting the empirical tests.

Our study contributes to the literature in management accounting suggesting that firms' business models should be statistically validated to ensure the company is not following a performance measurement system based on erroneous causal assumptions. Many of the scholars following this literature describe managers' decisions to pursue business models that are not statistically verified as "behavioral anomalies." We suggest instead that such behavior can be rational. We explain that rationality using a Bayesian framework that helps us to understand how managers should approach decisions about whether to test or not test their business models.

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[1] For example, despite our extraordinary access to data—the longitudinal data used by top management and the board over more than eight years—a power analysis suggests that our statistical tests lacked enough power to effectively validate all the relationships tested or, from a Bayesian perspective, to influence the managers' beliefs. If the managers had been interested in testing MTI's business model, then they would have needed to take actions to increase the power of the tests, such as increasing the volume of data compiled, refining the definition of the performance measures to increase the effects of the drivers of performance on financial performance, etc.

Our study highlights the importance of managers' prior beliefs and cost-benefit analyses on their assessments of the value of testing business models. This view suggests that testing a company's business model should not be expected to be equally useful for all firms and can help bridge the divide between advocates and skeptics of statistically validating business models. For example, testing business models can lead to relatively valuable insights in firms where the managers' priors about the business model are weak and the confidence level and power of the statistical tests are higher (e.g., the firms analyzed by Rucci et al. [1998], Campbell [2008], and Campbell et al. [2008]). The insights are less useful in firms where the managers assume the business model is correct and/or where the confidence level and power of the tests are lower (e.g., as in the firm analyzed by Malina et al. [2007] and MTI, the firm we study).

We discuss both the research and managerial implications of these findings and propose ways to identify and, whenever possible, overcome the costs of testing business models. Section II reviews the relevant literature. Section III describes our tests of MTI's business model. Section IV presents insights as to how managers update their beliefs in response to testing their company's business model and proposes a simplified cost-benefit analysis that can be used to assess the value of testing business models from a manager's perspective. Section V concludes.

II. LITERATURE REVIEW

Managers have long included nonfinancial measures in management-by-objectives (MBO), key performance indicators (KPI) or critical success factors (CSF) systems, some of which have come to be known as "dashboards" (e.g., Eckerson 2006).[2] Although the terminology is relatively recent, many of these nonfinancial measures are monitored as "performance drivers"—i.e., metrics providing leading indications of future performance. Researchers have tested relationships between some of these nonfinancial performance measures and *future* financial performance and/or contemporaneous value creation.[3] The vast majority of studies testing the relationship between nonfinancial measures and future financial performance focus on just a single performance driver. For example, generally positive relationships of these types have been found for: customer satisfaction (e.g., Anderson et al. 1994; Ittner and Larcker 1998b); employee satisfaction (e.g., Banker and Mashruwala 2007; Chen et al. 2008); quality (e.g., Roth and Jackson 1995; Sedatole 2003); and operational efficiency (e.g., Tsikriktsis 2007). Despite their different focuses, studies in the so-called "value relevance" literature in financial accounting show that certain nonfinancial performance measures are associated with stock returns.[4]

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[2] The term "nonfinancial measures" is typically defined broadly to include all measures other than GAAP summary measures (i.e., accounting profits and returns). Other measures denominated in monetary terms, such as individual income statement elements (e.g., revenues, gross margins, R&D expenditures) and ratios (e.g., revenue per employee) are included under the nonfinancial rubric.

[3] Contemporaneous value creation is commonly measured using stock market returns. It has been shown that stock prices lead financial performance (Kothari and Sloan 1992) since they incorporate expectations of future cash flows on a timely basis.

[4] Studies in this literature tend to choose industries where accounting measures are least likely to be value-relevant. They find that accounting profits and returns are generally not significantly related with stock price movements, but they do find that various nonfinancial measures are relevant in explaining stock prices and returns. For example, Amir and Lev's (1996) study of firms in the cellular telephone industry finds that *population size in the provider's service area* and *market penetration* are both value-relevant. Hirschey et al. (2001) show that *R&D expenditures* and the *patents* derived from them can explain stock returns. Similarly, *patent citations* by high-tech firms (Deng et al. 1999), and *book-to-bill ratios* of firms in the semiconductor industry (Chandra et al. 1999) are both found to be value-relevant. Trueman et al. (2000) find that measures of *Internet usage* (i.e., pageviews and unique visitors) provide some significant explanations of stock prices.

One validity threat in these scope-limited studies is that many individual performance drivers that are relevant in any given situation are not independent. Their effects can even interact. For example, in a study of a convenience store chain, Campbell et al. (2008) show that the success of a new strategy implemented (and subsequently abandoned) by the company depended on employee skills at the store level, itself a nonfinancial performance indicator. Without the requisite store-level employee skills, none of the other elements in the business model can be associated with higher performance.

Numerous academics and consultants have made recommendations to array the measures into stylized, complex business models that are more complete, yet parsimonious.[5] These models include the performance prism (Neely et al. 2002), the performance pyramid (Cross and Lynch 1988), the balanced scorecard (Kaplan and Norton 1992, 1996), the value chain scoreboard model (Lev 2001), the customer equity model (Rust et al. 2000), the tableau de bord (Malo 1995; Epstein and Manzoni 1997), and the European Foundation Quality Model (EFQM 2003). These business models provide "stories that explain how enterprises work" or "How do we make money in this business?" (Magretta 2002, 4), and are said to be superior to multifactor KPI or dashboard approaches to performance measurement because they are built around a hypothesized causal structure. This causal structure is essential for tying a strategy to expectations of future success (Magretta 2002). They describe how all, or at least many, of the elements of performance fit together, thus providing order to the potentially vast numbers of measures in the organization. This order allows for a focus on the aspects of performance that are most important, eliminating others that are either redundant or inconsequential, reducing the cognitive load placed on decision makers on the firm (Farrell et al. 2007). It also provides the structure for testing the validity of an enacted strategy.

Managers have been criticized for failing to test the validity of the hypothesized causal links on which models are built (Nørreklit 2000, 2003; Ittner and Larcker 2003). If the individual measures, or the combination of measures, are not valid, then the measures are just data; they have no information value. If the hypothesized links in the models are incorrect, then these models can actually mislead managers, causing them to pursue the wrong goals and to make flawed decisions (Magretta 2002; Kaplan and Norton 2004, 2008).

Testing a company's business model not only allows managers to check whether their overall business model is correct, but also to discover what measures matter, or do not matter, under what conditions. The managers' improved understanding of the company's performance drivers can, in turn, translate into a more efficient allocation of resources. Using data from a survey of 157 companies in various industries, Ittner and Larcker (2003, 91) found that firms that "consistently built and verified causal models" on average had 2.95 percent higher returns on assets and 5.14 percent higher returns on equity than firms that did not rely on causal models.

Three longitudinal studies, all of which were conducted in multi-unit organizations, illustrate useful insights that can be obtained when conducting these tests. First, during a turnaround situation at Sears in 1994–95, Sears executives hired a consulting firm skilled in econometrics to help analyze data taken from 800 stores, initially over two quarters (Rucci et al. 1998). The collection of measures provided to the consultants was based on a loose initial model of firm performance linking employees, customers, and shareholders in a causal chain. The executives hypothesized that in their retailing environment, employee attitudes affected customer attitudes and behavior, which, in combination, affected Sears' financial performance. Since the senior managers were unsure about the business model they should be pursuing, the consultants used exploratory statistical methods to construct, rather than to test, the explicit causal model. These studies led to identifying the measurement indicators that were driving Sears' performance and that managers then used to successfully implement the company's well-publicized "three C's" model—aimed at making Sears a "Compelling Place to Work, a Compelling Place to Shop, and a Compelling Place to Invest" (Rucci et al. 1998, 88–89).

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[5] We use the term "business model" to represent all of these stylized combinations of measures.

Second, the executives of TD Canada Trust, a new bank resulting from the merger of Canada Trust and Toronto-Dominion Bank, hired a consulting firm to identify the service behaviors measured by the bank that were most likely to drive customer satisfaction and branch network profitability (Campbell 2008). Using factor analyses, the consultants identified four service dimensions and linked them to customer satisfaction and to branch profitability via regression analyses. They also identified the service dimensions that had the strongest impact on profitability.

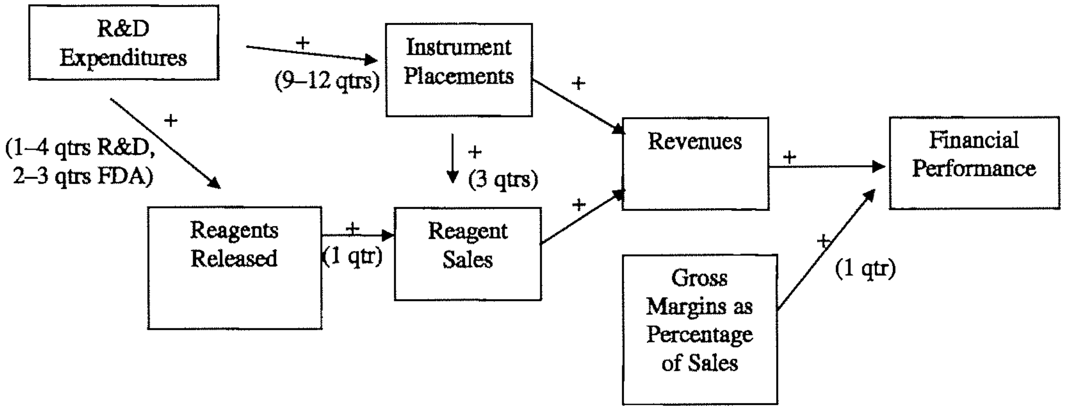
Third, Campbell et al. (2008) conducted field interviews and then analyzed balanced scorecard data from a convenience store chain during the implementation of a new store-level strategy. The new differentiation strategy emphasized theme-oriented promotions fostering employee interactions with customers, rather than the traditional convenience store qualities of speed and efficiency. But the researchers found evidence that wherever the new strategy had been implemented, its effect on financial performance was negative. In further analyses, they discovered an interaction effect: the new strategy had positive effects on financial performance only in stores with high levels of crew skills. Without ever doing formal statistical analyses, the company abandoned the new strategy two years after implementing it. Campbell et al. (2008) argue that statistical analyses would have enabled earlier detection of the problems.

While the advantages of testing business models seem to be compelling, the causal assumptions of companies' business models are rarely subjected to formal empirical testing (Nørreklit 2000, 2003; Ittner and Larcker 2003). Only 21 percent of the companies in Ittner and Larcker's (2003) study tested the cause-and-effect relationships in their business models, which raises the question: Why do so many managers fail to validate their companies' business models? The literature to date provides mostly untested explanatory presumptions, such as those provided by Ittner and Larcker (2003)—i.e., laziness, thoughtlessness, and/or mendacity—as mentioned above. Some studies, such as Dikolli and Sedatole (2007), enumerate challenges managers can experience when testing relationships between nonfinancial and financial measures of performance, but such challenges do not imply that a firm should avoid testing its business model. Instead they merely suggest that managers should consider different model specifications and contingencies when testing their models to obtain richer information from the analyses.

To our knowledge, Malina et al. (2007) are the only scholars providing an explanation for why companies would not test their business models. Malina et al. (2007) tested the cause-and-effect properties of a "distributor balanced scorecard" used by the North American distribution channel of a Fortune 500 company. Their tests failed to validate the distribution channel's business model, thereby refuting causality as an explanation for the scorecard's apparent success. Despite these results, both the firm and its distributors continued to express satisfaction with the scorecard and continued to use it for management control. Malina et al. (2007) address this seeming paradox with evidence that the ostensibly causal links in their firm's distributor balanced scorecard were not, in fact, causal, and therefore should not have been tested as such. Further, they suggest that this lack of causality may be a common feature of stylized business models such as the balanced scorecard.

While prior literature has pointed to some of the challenges researchers can confront when testing business models or, more generally, conducting statistical analyses in organizations (Dikolli and Sedatole 2007; Malina et al. 2007), we believe it has not yet provided a clear explanation of why so few companies test their business models and, more generally, how managers decide whether to test their companies' business models.

FIGURE 1
Pictorial Illustration of the Major Elements in the Business Model for "MTI"



III. TEST OF THE CAUSAL RELATIONS IMPLICIT IN MTI'S BUSINESS MODEL

Our study took advantage of our access to what we believed to be a favorable setting to test the causal relationships underlying a company's business model. MTI seemed to be a favorable setting for multiple reasons. First, it operates only in a single line of business—production and sale of equipment used for performing medical diagnostic tests. Thus, the corporate performance measures are not distorted by shifts in cross-business sales mix. Second, the firm had a stable management team and followed the same business model with considerable success for more than a decade. Finally, MTI is publicly traded, allowing us to test the impact of the firm's drivers of performance on not only accounting outcomes, but also stock returns. Notably, our research site implemented a unique business model in a single operating unit, a more common situation than the situation analyzed in previous studies, in which the business model is implemented across multiple, homogenous business units.

As in most companies, managers at this research site have beliefs and assumptions about their business model. They base many important business decisions on those beliefs and assumptions but never test them statistically. In our field interviews, MTI managers explained that the company follows what is commonly referred to as a "razor/razor blade" strategy. That is, it sells the test equipment (called "instruments") at a small markup, or even at break-even. It then makes most of its profits selling the consumable kits (called "reagents") used within the instruments to perform the tests. Its customers are mostly hospitals and independent laboratories located in over 100 countries around the world. In various geographical regions, MTI sells either directly to customers using its own sales force or indirectly through distributors.

Through interviews with members of top management and the board of directors, we developed the representation of MTI's business model depicted in Figure 1. In this model, (1) research and development expenditures, (2) instrument placements, (3) number of reagents released for sale, and (4) changes in gross margins are the key performance drivers leading to higher income and shareholder value.

The model in Figure 1 also reflects management's beliefs about the paths to value creation and the hypothesized lengths of the lags between changes in the drivers and the performance effects. Interviews with MTI's management suggest that the earliest drivers of performance in the business

FIGURE 2
Path 1 to Value Creation

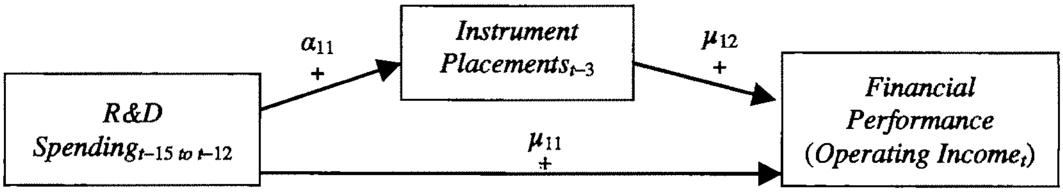

R&D Spending$_{t-15\ to\ t-12}$
α_{11} +
Instrument Placements$_{t-3}$
μ_{12} +
μ_{11} +
Financial Performance (Operating Income$_t$)

FIGURE 3
Path 2 to Value Creation

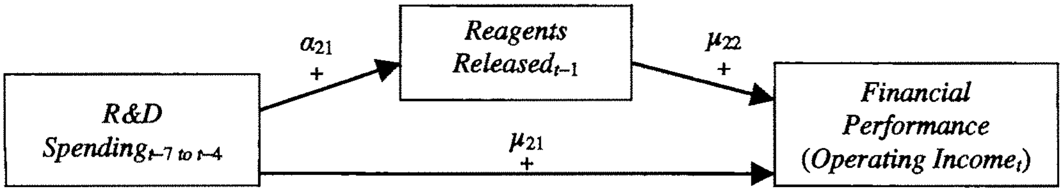
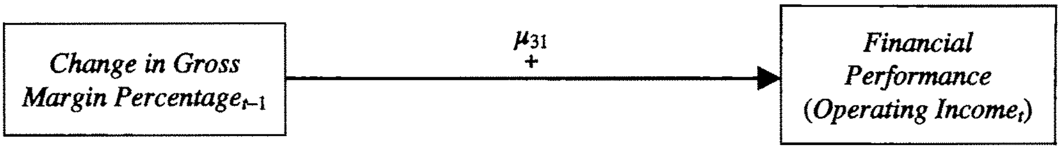

R&D Spending$_{t-7\ to\ t-4}$
α_{21} +
Reagents Released$_{t-1}$
μ_{22} +
μ_{21} +
Financial Performance (Operating Income$_t$)

FIGURE 4
Path 3 to Value Creation


Change in Gross Margin Percentage$_{t-1}$
μ_{31} +
Financial Performance (Operating Income$_t$)

model lead financial performance by as much as 15 quarters. Figure 1 depicts three causal paths to financial performance.[6] In the first path (hereafter, Path 1), depicted in Figure 2, R&D leads to performance via instrument placements. In the second path (hereafter, Path 2), R&D leads to performance via the release of newly developed reagents (Figure 3). Finally, the third path (hereafter, Path 3) suggests changes in gross margins positively affect operating income over the following quarter (Figure 4).

Our first goal is to test company managers' assumptions about the business model. We also check whether the managers missed any significant model parameters, as we obtained other data monitored by top management and the board of directors that they did not include in the parsimonious model they described to us. To achieve our goals, we conduct a set of tests using the entire summary set of data monitored on a quarterly basis by MTI's board of directors and top management for a 34-quarter period from the first quarter of 1998 to the second quarter of 2006. These data include an array of financial and nonfinancial measures and include data regarding each of the four elements in the business model—research and development expenditures, instrument placements, new reagent tests released, and changes in gross margins. We supplement these data with publicly available data from three other sources: CRSP, to obtain data on stock returns; Compustat, to obtain data on research and development expenditures, net income, and sales in the quarters preceding those available from MTI's internal records;[7] and 10-K reports, to identify any unusual events experienced by the firm over our sample period.

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[6] We define a causal relationship between A and B as one where "if A occurs, then the probability of B occurring increases (or changes)" (Granger 1980, 334). The relationships depicted in Figure 1 are expected to be causal in all but two cases: the case that links contemporaneous reagent sales to total sales (revenues), and the case that links revenues to financial performance (measured as operating income). As Malina et al. (2007) suggest, these relations can be described as "logical," since they hold true by definition rather than arise from cause-effect relations. We exclude those two links from our empirical tests.

Using these data, we conduct three tests:

1. *Association between drivers of performance in MTI's business model and financial performance.* We initiate our analysis by testing MTI's business model with financial performance (measured as quarterly operating income) as the dependent variable. We conduct univariate analyses associating 15 lags of each of the four key performance drivers in the business model with quarterly operating income. Then we integrate all the performance drivers (measured according to the lags proposed in Figure 1) into a single OLS regression and examine their overall effect on operating income. The first row of Figure 5 presents a summary of the tests and variables utilized. Notice we do not include quarterly reagent sales or total revenues as additional variables leading to higher operating income given that reagent sales (and more broadly revenues) are included by definition in the operating income figure.
2. *Path analysis of MTI's business model.* Next we examine the validity of each of the three paths that lead to financial performance (proxied by quarterly operating income) according to the business model (Figures 2, 3, and 4). The second row of Figure 5 depicts the OLS regressions used to test the three paths. We used the Baron and Kenny (1986) approach to test the mediation effects of instrument placements in Path 1 and of reagents released in Path 2. An examination of the coefficients indicates whether or not mediation effects exist. For example, assume β_{11} in Path 1 (see Equations (2), (3), and (4) in Figure 5) is positive and significant. If coefficients α_{11} and μ_{12} are positive and significant, but coefficient μ_{11} is insignificant, then that would mean that the instrument placements metric fully mediates the relation between R&D spending and operating income. If coefficient μ_{11} remains significant, then the instrument placements metric would only be partially mediating the relation. In this latter case, other aspects of R&D spending would play a role on the extent to which the measure leads to financial performance.
3. *Association between drivers of performance in MTI's business model and stock returns.* Finally we examine whether changes in each of the four key performance drivers are associated with stock market returns on a timely basis. To do this we define a baseline model consistent with Ohlson (1995, 2001) that associates stock returns (i.e., change in market value of equity) with net income (i.e., change in book value of equity), change in net income, and changes in expected long-term growth (proxied by changes in annual sales growth up to the previous quarter). We add the leading indicators described in MTI's business model (Figure 1), expressed as changes in earnings components (changes in R&D expenditures) and increases in book value of equity due to increases in intangible assets (change in gross margin percentage, number of reagents released, number of instrument

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[7] This allowed us to calculate change and lagged values for these variables in the early quarters of 1998.

FIGURE 5
Tests of the Assumptions Implicit in MTI's Business Model

	Main Tests	Variables
1. Tests of MTI's business model using operating income as the dependent variable	**Univariate Analyses:** Correlations between Operating Income and 15 lags of R&D Spending, Instrument Placements, Reagents Released, and Gross Margin Percentage **Multivariate Analyses** $\mathit{Operating\ Income}_t = \gamma_0 + \gamma_1 \times \sum_{k=12}^{15} R\ \&\ D\ \mathit{Spending}_{t-k} + \gamma_2 \times \sum_{k=4}^{7} R\ \&\ D\ \mathit{Spending}_{t-k} + \gamma_3 \times \mathit{Instrument\ Placements}_{t-3} + \gamma_4 \times \mathit{Reagents\ Released}_{t-1} + \gamma_5 \times \mathit{Gross\ Margin\ Percentage}_{t-1} + \gamma_n \times \mathit{Controls}_t + \varepsilon_t$ (1)	*Operating Income* = quarterly operating income in thousands of dollars; *R&D Spending* = research and development expenditures in thousands of dollars; *Instrument Placements* = number of instrument units installed during the quarter; *Reagents Released* = number of releases in the quarter; and *Gross Margin Percentage* = quarterly gross margin divided by total sales, multiplied by 100. *Controls* include three indicator variables: • *FDA Indicator* is equal to 1 from the first quarter of 2004 to the third quarter of 2005 when the firm was subject to a suspension of FDA reviews of its new and pending applications, and 0 otherwise. • *DOJ Indicator* is equal to 1 from the first quarter of 2003 through the second quarter of 2005 when the firm was the subject of a Department of Justice investigation for possible violation of the Foreign Corrupt Practices Act in one of its foreign subsidiaries, and 0 otherwise. • *Summer Indicator* is equal to 1 in the summer (third) quarter of the year when financial performance is said to decline due to seasonality, and 0 otherwise.
2. Tests of MTI's business model using path analysis	**Test of Path 1** $\mathit{Instrument\ Placements}_{t-3} = \alpha_{10} + \alpha_{11} \times \sum_{k=12}^{15} R\ \&\ D\ \mathit{Spending}_{t-k} + \varepsilon_t$ (2) $\mathit{Operating\ Income}_t = \beta_{10} + \beta_{11} \times \sum_{k=12}^{15} R\ \&\ D\ \mathit{Spending}_{t-k} + \beta_{1n} \times \mathit{Controls}_t + \varepsilon_t$ (3) $\mathit{Operating\ Income}_t = \mu_{10} + \mu_{11} \times \sum_{k=12}^{15} R\ \&\ D\ \mathit{Spending}_{t-k} + \mu_{12} \times \mathit{Instrument\ Placements}_{t-3} + \mu_{1n} \times \mathit{Controls}_t + \varepsilon_t$ (4) **Test of Path 2** $\mathit{Reagents\ Released}_{t-1} = \alpha_{20} + \alpha_{21} \times \sum_{k=4}^{7} R\ \&\ D\ \mathit{Spending}_{t-k} + \alpha_{22} \times \mathit{FDA\ indicator}_{t-1} + \varepsilon_t$ (5) $\mathit{Operating\ Income}_t = \beta_{20} + \beta_{21} \times \sum_{k=4}^{7} R\ \&\ D\ \mathit{Spending}_{t-k} + \beta_{2n} \times \mathit{Controls}_t + \varepsilon_t$ (6) $\mathit{Operating\ Income}_t = \mu_{20} + \mu_{21} \times \sum_{k=4}^{7} R\ \&\ D\ \mathit{Spending}_{t-k} + \mu_{22} \times \mathit{Reagents\ Released}_{t-1} + \mu_{2n} \times \mathit{Controls}_t + \varepsilon_t$ (7) **Test of Path 3** $\mathit{Operating\ Income}_t = \mu_{30} + \mu_{31} \times \Delta \mathit{Gross\ Margin\ Percentage}_{t-1} + \mu_{3n} \times \mathit{Controls}_t + \varepsilon_t$ (8)	
3. Tests of MTI's business model using stock returns as the dependent variable	**Univariate Analyses:** Correlations between Stock Returns and ΔR&D Spending, Instrument Placements, Reagents Released, and ΔGross Margin Percentage **Multivariate Analyses** $\mathit{Stock\ Returns}_t = \beta_0 + \beta_1 \times \mathit{Net\ Income}_t + \beta_2 \times \Delta\ \mathit{Net\ Income}_t + \beta_7 \times \Delta\ \mathit{Expected\ Growth}_t + \beta_3 \times \Delta \mathit{Gross\ Margin\ Percentage}_t + \beta_4 \times \mathit{Instrument\ Placements}_t + \beta_5 \times \mathit{Reagents\ Released}_t + \beta_6 \times \Delta R\&D\ \mathit{Spending}_t + + \beta_n \times \mathit{Controls}_t + \varepsilon_t$ (9)	**In addition to the variables above:** *Stock Returns* = quarterly stock price returns; *Net Income* and *ΔNet Income* = net income at time *t* and change in net income from time *t*−1 to time t, by market value of equity; *Expected Growth* = annual expected growth up to quarter *t*−1; and *ΔExpected Growth (ΔR&D Spending)* = expected growth (R&D spending) in time *t* minus expected growth (R&D spending) in time *t*−1 deflated by market value of equity.

TABLE 1

Descriptive Statistics

	Number of Quarters	Mean	Standard Deviation	Minimum	Maximum
Performance Measures					
Stock Returns	34	0.06	0.18	−0.22	0.68
Operating Income	34	16,197	7,024	5,740	29,325
Business Model Leading Indicators					
R&D Spending	34	9,067	2,813	5,409	14,926
Instrument Placements	34	168	35	98	227
Reagents Released	34	2.97	3.31	0	14
Gross Margin Percentage	34	56.23	1.66	51.11	58.91
Controls					
FDA Indicator	34	0.21	0.41	0	1
DOJ Indicator	34	0.29	0.46	0	1
Summer Indicator	34	0.24	0.43	0	1
Expected Growth	34	12.32	4.34	4.58	19.87

Data are based on quarterly internal reports from MTI from the first quarter of 1998 to the second quarter of 2006, CRSP, and Compustat. *Stock Returns* are stock returns calculated as the compounded value of monthly returns (variable RET in CRSP) over the quarter. *Operating Income* and *R&D Spending* (i.e., research and development expenditures) are obtained directly from MTI's internal reports (or Compustat whenever lagged variables were required), and are expressed in thousands of dollars. *Instrument Placements* are the number of instrument units installed during the quarter, while *Reagents Released* are measured as the number of releases in the quarter. *Gross Margin Percentage* is quarterly gross margin divided by total sales, multiplied by 100. The *FDA*, *DOJ*, and *Summer Indicator* variables take a value of 1 during the quarters when the FDA ceased to approve reagents (first quarter of 2004 to third quarter of 2005), during the period when one of MTI's foreign subsidiaries was subject to a Department of Justice investigation (first quarter of 2003 through second quarter of 2005), and during the summer (third) quarter of each year, respectively, and a value of 0 otherwise. *Expected Growth* is measured as annual sales growth up to quarter $t-1$.

placements), to examine whether these changes lead to higher stock market returns. The equation and variables used are shown in the third row of Figure 5.

Table 1 presents descriptive statistics for our variables. Our summary statistics show that MTI generated positive operating income every quarter of the period studied. On average, it generated $16 million in quarterly operating income.[8] MTI's market performance was also positive, with an average quarterly stock return of +6 percent. However, the stock price experienced significant variation: quarterly stock returns ranged from −22 percent to +68 percent. With regard to our main explanatory variables, research and development expenditures averaged $9 million per quarter, and gross margins averaged 56 percent of sales. MTI installed an average of 168 instruments and released an average of three reagents every quarter. It is important to note that of these four key performance drivers, gross margin percentage exhibits the smallest coefficient of variation (with a standard deviation of only 1.66 percent, mean 56.23 percent), suggesting this driver is likely to explain relatively less of the variation in firm performance.

Our tests of the business model yielded three empirical results. First, our univariate tests in Table 2 suggest that lagged values of both *R&D Spending* and *Instrument Placements* are positively associated with *Operating Income* at time t, as predicted in Figure 1 (predicted lags are italicized in

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[8] Some of these data have been scaled to maintain company confidentiality.

TABLE 2

Univariate Analyses

Correlations between MTI's Key Leading Indicators with Different Lags and *Operating Income* in Quarter *t*

Correlations between *Operating Income* in Quarter *t* and the Following Leading Indicators	**Predicted**	**Leading Indicator in Quarter**														
		$t-15$	$t-14$	$t-13$	$t-12$	$t-11$	$t-10$	$t-9$	$t-8$	$t-7$	$t-6$	$t-5$	$t-4$	$t-3$	$t-2$	$t-1$
R&D Spending	+	***0.863***	***0.852***	***0.886***	***0.906***	**0.874**	**0.876**	**0.899**	**0.898**	***0.875***	***0.892***	***0.925***	***0.916***	**0.900**	**0.896**	**0.920**
		(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	(0.00)	(0.00)	(0.00)	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	(0.00)	(0.00)	(0.00)
Instrument Placements	+	**0.592**	**0.528**	**0.618**	**0.701**	**0.638**	**0.695**	**0.755**	**0.696**	**0.689**	**0.767**	**0.672**	**0.647**	***0.631***	**0.646**	**0.542**
		(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	*(0.00)*	(0.00)	(0.00)
Reagents Released	+	−0.157	−0.226	−0.508	−0.406	−0.418	−0.394	−0.547	−0.438	−0.470	−0.467	−0.492	−0.533	−0.451	−0.481	*−0.497*
		(0.74)	(0.83)	(0.99)	(0.97)	(0.98)	(0.97)	(1.00)	(0.99)	(0.99)	(0.99)	(1.00)	(1.00)	(0.99)	(1.00)	*(1.00)*
ΔGross Margin Percentage	+	−0.105	0.057	0.083	0.109	−0.193	0.052	0.134	0.140	−0.170	−0.257	0.115	0.118	−0.145	−0.234	*0.135*
		(0.66)	(0.41)	(0.36)	(0.32)	(0.81)	(0.41)	(0.27)	(0.25)	(0.80)	(0.90)	(0.28)	(0.27)	(0.78)	(0.90)	*(0.23)*

One-tailed p-values are presented in parentheses. Correlations are highlighted in bold if significant at a 10 percent level. The correlations between *Operating Income* at time *t* and the leading indicators at the predicted lags (see Figures 1–4) are italicized. Detailed definitions of the variables are provided in Figure 5.

TABLE 3

Association between Leading Indicators in MTI's Business Model and *Operating Income* in Quarter *t*

		Operating Income$_t$	
	Predicted	(1)	(2)
Intercept		**14,825**	**−7,115**
		(10.93)	(−2.20)
R&D Spending$_{t-15\text{ to }t-12}$	+		−0.88
			(−1.06)
R&D Spending$_{t-7\text{ to }t-4}$	+		**1.30**
			(1.92)
Instrument Placements$_{t-3}$	+		**29.43**
			(1.64)
Reagents Released$_{t-1}$	+		35.88
			(0.17)
ΔGross Margin Percentage$_{t-1}$	+		**547.75**
			(2.30)
FDA Indicator	−	3,500	**−2,347**
		(1.16)	(−1.45)
DOJ Indicator	−	6,065	2,128
		(2.25)	(1.14)
Summer Indicator	−	−1,065	−1,037
		(−0.45)	(−0.87)
n		30	30
Adjusted R^2		30.86%	83.97%
			Comparison to Model (1) ΔAdjusted R^2 = 53.11% F-statistic = **18.23** p-value = 0.000

t-statistics are presented in parentheses. Coefficients and F-values are highlighted in bold if significant at a 10 percent level, based on one-tailed p-values for directional predictions, and two-tailed otherwise. Lagged values of the variables are represented with a subscript note indicating the number of lags relative to quarter *t*. Regressions include 30 rather than 34 observations given that some four-quarters lagged variables had missing values during the four quarters of 1998. Detailed definitions of the variables are provided in Figure 5.

Table 2). However, none of the lagged values of *Changes in Gross Margin Percentage* are significantly related to *Operating Income* at time *t*, and lagged values of *Reagents Released* are negatively, rather than positively, associated with *Operating Income* in quarter *t* (though insignificantly). Our multivariate tests presented in Table 3 suggests that together the leading indicators provide a statistically significant explanation of *Operating Income*. As in the univariate analyses, *R&D Spending* and *Instrument Placements* are positively and significantly related to *Operating Income*.[9] Changes in *Gross Margin Percentages* also become significant in this

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[9] We replicate the model in Table 3 including each of the two variables of *R&D Spending* separately (i.e., one at a time) to avoid multicollinearity concerns. Untabulated results are consistent with those reported in Table 3, except that, when tested individually, both measures of R&D spending (rather than just one) are positively and significantly associated with operating income at time *t*.

TABLE 4

Univariate Analyses: Correlations between MTI's Key Leading Indicators and *Stock Returns*

	Predicted	*Stock Returns*
ΔR&D Spending	+	−0.147 (0.797)
Instrument Placements	+	0.084 (0.318)
Reagents Released	+	0.178 (0.157)
ΔGross Margin Percentage	+	−0.019 (0.541)

One-tailed p-values are presented in parentheses. Detailed definitions of the variables are provided in Figure 5.

regression, indicating that the failure to find a significant relationship in Table 2 may have been explained by the omission of the other business model indicators in the correlations.[10] Overall, these analyses provide partial but not full support for MTI's business model.

Our second set of analyses, examining the three paths leading to value creation illustrated in Figures 2, 3, and 4, and described in the second row of Figure 5, support only one of the three paths leading to financial performance. Untabulated results show a significant relation between *R&D Spending* from quarters t–15 to t–12 and *Instrument Placements* at time t–3 (Equation (2), Figure 5), and a significant association between *R&D Spending* from quarters t–15 to t–12 and *Operating Income* in quarter t (Equation (3), Figure 5). The results of Equation (4), Figure 5 further show that the association between *R&D Spending* and *Operating Income* is partially, but not fully, mediated by *Instrument Placements*. While we found evidence consistent with the relations depicted in Path 1 (Figure 2), we found no evidence supporting Path 2 (there is no association between the number of reagents released and either *R&D Spending* or future financial performance) or Path 3 (a change in *Gross Margin Percentage* at time t–1 is positively but insignificantly related to *Operating Income* at time t). Overall the tests of Paths 1, 2, and 3 fail to support the structural path depicted in Figure 1.

Finally, our third set of tests shows that the four key leading indicators in MTI's business model provide only limited information explaining contemporaneous stock performance. Table 4 shows that none of the key leading indicators is correlated with contemporaneous quarterly stock returns. When the change in *R&D Spending*, *Instrument Placements*, *Reagents Released*, and change in the *Gross Margin Percentage* are included in the model together (see Table 5), the coefficients for *Instrument Placements* and *Reagents Released* become statistically significant and the adjusted R^2 increases from 3.88 percent to 10.20 percent, yet the F-statistic comparing Model (2) to Model (1) shows that the increase in the explanatory power is not statistically significant ($F = 1.44$, $p = 0.26$). Overall, these results provide only weak support for a contemporaneous association between the firm's value drivers and the market value of its equity.

We considered other data items included in the company's dashboard but not in its business

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[10] We replicate the model in Table 3 using Newey-West standard errors to correct for serial correlation. In two alternative tests, we consider lags of up to four and eight quarters in the autocorrelation structure. Results remain unchanged.

TABLE 5
Association between Leading Indicators in MTI's Business Model and *Stock Returns*

		Stock Returns	
	Predicted	(1)	(2)
Intercept		−0.23	**−0.68**
		(−1.32)	(−2.30)
Net Income	+	**24.21**	**31.78**
		(1.77)	(2.19)
ΔNet Income	+	−32.12	−37.85
		(−1.99)	(−1.87)
ΔExpected Growth	+	0.02	0.01
		(0.60)	(0.46)
ΔR&D Spending	+		−57.61
			(−1.31)
Instrument Placements	+		**0.002**
			(1.70)
Reagents Released	+		**0.02**
			(1.37)
ΔGross Margin Percentage	+		12922.06
			(0.89)
FDA Start Indicator	−	−0.15	−0.09
		(−0.77)	(−0.48)
FDA End Indicator	+	−0.04	−0.08
		(−0.19)	(−0.39)
DOJ Start Indicator	−	−0.07	−0.04
		(−0.36)	(−0.23)
DOJ End Indicator	+	0.04	0.05
		(0.15)	(0.20)
n		33	33
Adjusted R^2		3.88%	10.20%
			Δ Adjusted R^2 = 6.32%
			F-statistic = 1.44
			p-value = 0.26

t-statistics are presented in parentheses. Coefficients and F-values are highlighted in bold if significant at a 10 percent level, based on one-tailed p-values for directional predictions, and two-tailed otherwise. Net income values are obtained from Compustat and are measured in thousands of dollars. All explanatory variables are deflated by beginning market value of equity. Analyses include 33 rather than 34 observations since some changes variables had missing values in the first quarter of 1998. Detailed definitions of the variables are provided in Figure 5.

show model as alternative drivers of performance, but none of them were significant, and none changed the results obtained from testing the business model depicted in Figure 1.[11] Our findings are also robust to alternative specifications, including alternative lag structures and other refinements suggested by top managers based on preliminary results.[12]

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[11] Specifically, we considered a measure capturing the percentage of sales from international operations, a measure of the degree of integration among divisions (measured as the percentage of sales from intercompany operations), and a measure capturing the income contribution from affiliates. We selected the lag-lengths of these performance drivers that best explained operating income. Our analyses suggest that none of these additional variables provide significant incremental information to explain future operating income or stock returns, relative to the leading indicators already included in the business model.

It surprised us that, despite the seemingly favorable conditions to test the business model and MTI's unequivocally successful track record, our results provided only weak support of the business model. We were also surprised by the fact that while our tests did not provide strong support for the hypotheses implicit in MTI's business model, management continued to express confidence in the validity of their model. The main insights from this study emerged from our further explanations of these puzzles, as presented in the following section.

IV. INSIGHTS ON THE VALUE OF TESTING A COMPANY'S BUSINESS MODEL

As mentioned above, most researchers testing companies' business models suggest that statistical validation should be a necessary condition to continue pursuit of a business model (Ittner and Larcker 2003; Campbell et al. 2008). According to this view, the fact that the managers would continue to rely on their existing business model despite its lack of statistical validation might indicate either lack of confidence in the tests or some degree of management irrationality or opportunism.

In follow-up interviews, the MTI managers claimed that they had no reason to question our analyses, but they also believed that the data that we utilized were insufficient to be conclusive. Just because the formal statistical techniques could not validate the model does not necessarily mean that the model is not valid. During the 12 years that MTI had followed this business model, sales had grown at an average rate of 29 percent annually, average annual shareholder returns were greater than 40 percent, and the company had expanded its sales to customers based in more than 100 countries. This success over an extended period of time provides considerable support for the model's validity.

Based on our field work, we concluded that this model-testing judgment problem might be best understood from the perspective of Bayesian inference. Following the framework of Burgstahler (1987),[13] Bayesian-rational managers would update their prior belief, $P(H_A)$, regarding the validity of a hypothesized relationship in response to a nonsignificant test result to form a revised posterior belief, $P(H_A \mid NS)$, as follows:

$$P(H_A \mid NS) = \frac{P(NS \mid H_A) * P(H_A)}{P(NS \mid H_A) * P(H_A) + P(NS \mid H_0) * P(H_0)} \tag{10}$$

where,

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[12] The results from tests of Paths 1 and 2 using revenue from reagent sales in place of operating income support Path 1 but not Path 2. Likewise, the results of tests using other accumulation periods for lagged R&D spending to encompass the full range of managers' estimates (i.e., in Path 1 we tested *R&D Spending* over t–23 to t–3 and in Path 2 we tested *R&D Spending* over t–16 to t–5) support Path 1 but not Path 2. At the suggestion of MTI managers, tests of Path 2 that include an interaction term between reagents released and the cumulative number of reagents released to-date, to test for nonlinearity arising from possible diminishing returns to new reagents, fail to find support for Path 2. Specifications that include as additional explanatory variables lags of the dependent variable that correspond in time to the principal independent variables also indicate that both *R&D Spending* and *Instrument Placements* are incrementally informative about future *Operating Income*, but neither *Reagents Released* nor *Change in Gross Margin Percentage* provide information incremental to their contemporaneous measures of *Operating Income*. Similarly, regressions of stock returns on the postulated value-drivers lagged by one quarter to capture market response to the release of quarterly reports or delayed incorporation of information into prices find a positive relationship between returns and instrument placements in the prior quarter but no significant relationship with other drivers.

[13] Throughout Section VI we assume there exist only two states of the world where either H_0 or H_A is true. As in Burgstahler (1987), we do not consider cases that may include a composite set of alternative hypotheses. Additionally, we assume that the managers will update their priors about the state of the world (i.e., whether the business model is correct or not), based on whether or not a test yields significant or insignificant results rather than based on the magnitude of the statistic used to reach such conclusion. Both of these assumptions simplify the exposition of our analyses without altering the qualitative insights drawn from them.

H_A = alternative hypothesis, predicting the relationships in the business model are valid; and
H_0 = null hypothesis, indicating the relationships in the business model do not exist.

If the managers assigned a prior probability to H_A that was either very high or very low (i.e., $P(H_A)$ close to 0 or 1), then the update in beliefs, $|P(H_A|NS) - P(H_A)|$, would be small. Indeed, given the company's success, as described above, the managers at MTI had no reason to believe that their business model was flawed. Viewed from a Bayesian perspective, this belief is consistent with a high posterior probability that H_A is correct, even after seeing the mostly insignificant results from tests of the business model.

Prior Beliefs and the Power of the Test

The extent to which managers should hold on to the belief that the relationships assumed by the business model are correct depends not only on the probability assigned to the alternative hypothesis *ex ante,* but also on the test's ability to discriminate between the null and the alternative hypotheses. This ability is reflected in the conditional probabilities in Equation (10), where the probability α of rejecting the null when the null is true ("Type 1" error) is equal to $1 - P(NS|H_0)$, and the probability β of not rejecting the null when the alternative is true ("Type 2" error) is equal to $P(NS|H_A)$. Equation (10) can be re-written as:

$$P(H_A\,|\,NS) = \frac{\beta P(H_A)}{\beta P(H_A) + (1-\alpha)(1-P(H_A))}. \tag{11}$$

For a conventional significance criterion (say, $\alpha = 10$ percent), the managers will revise their beliefs to a greater degree the lower is the β (i.e., the higher is the power of the test, $1 - \beta$). We estimated the power of our tests following Cohen (1988, 407–443) and found that, despite our access to the data used by MTI's top managers and directors over an eight-and-one-half-year period, our analyses did not have enough power to detect the relations examined. Table 6 suggests that the probability of rejecting the null when the null is indeed false is low whenever the real effect of the variables of interest is of small or medium size (i.e., when the variables of interest account for approximately 2 percent or 13 percent of the dependent variable's variance in the population [Cohen 1988, 412–413]). In such cases, the power of the tests ranges from 14 percent to 66 percent.

In addition, the fact that the managers at MTI stated a high prior belief in their model implies that the power required to change the managers' beliefs must be correspondingly high. For example, assuming the probability assigned to the model being correct is 90 percent (a number suggested by a board member, i.e., $P(H_A) = 0.9$), and $\alpha = 10$ percent, the power of the test required to change the managers' belief that the business model was more likely to be correct than not (i.e., the power required to achieve a $P(H_A \mid NS) < 0.5$) must be $1 - \beta = 90$ percent. Not even the most powerful of our tests, according to the calculations in Table 6, would have fulfilled this requirement. The only variable that managers expected to have strong effects on performance (i.e., a "large effect" where, according to Cohen [1988, 413–414], the variable would explain about 30 percent of the dependent variable's variance in the population) was *Instrument Placements*. The other drivers were expected to have smaller effects (small- or medium-size effects) due to measurement noise or lack of consistency on the extent to which variables such as R&D or reagent approvals led to performance.

Prior Beliefs and Data Constraints for Testing the Business Model

The managers' initial confidence in the business model not only led to an increase in the required power of the tests, but it also led the managers to use their performance measurement system in ways that were inconsistent with testing the company's business model. Instead of using

TABLE 6

***Post Hoc* Estimation of the Power of the Tests $(1 - \beta)$ Using a Significance Criterion $\alpha = 10$ Percent**

			Probability of Rejecting the Null Hypothesis When the Null Is Indeed False and the Actual Effect of the Variables of Interest Is:		
Tests	**Variables of Interest**	**Null Hypothesis**	**Small**	**Medium**	**Large**
(1) Effect of all leading indicators on *Operating Income* (Table 3, Model 2)	*R&D Spending* *Instrument Placements* *Reagents Released* Δ*Gross Margin Percentage*	The incremental effect of the variables of interest on *Operating Income* is 0.	13.5%	38.6%	71.2%
(2) Path 1 to *Operating Income* (untabulated) Path 2 to *Operating Income* (untabulated)	In Path 1: *R&D Spending* *Instrument Placements* In Path 2: *R&D Spending* *Reagents Released*	The incremental effect of the variables of interest on *Operating Income* is 0.	16.4%	55.0%	87.2%
(3) Path 3 to *Operating Income* (untabulated)	Δ*Gross Margin Percentage*	The incremental effect of Δ*Gross Margin Percentage* on operating income is 0.	19.5%	66.2%	93.4%
(4) Effect of all leading indicators on *Stock Returns* (Table 5, Model 2)	Δ*R&D Spending*, *Instrument Placements*, *Reagents Released*, Δ*Gross Margin Percentage*	The incremental effect of the variables of interest on *Stock Returns* is 0.	14.4%	45.6%	79.8%

We employ conventional operational definitions of small, medium, and large effect sizes (for details see Cohen [1988, 412–414]). For the tests where operating income is the dependent variable, small, medium, and large effects occur when the variables of interest increase the actual R^2 by 1.2, 8.1, and 14.8 percentage points respectively, relative to the R^2 of the basic model presented in Table 3, Model 1 (we estimate the basic models' R^2 using the estimated unadjusted $R^2 = 38\%$). For the tests where *Stock Returns* is the dependent variable, small, medium, and large effects occur when the variables of interest increase the population's R^2 by 1.6, 10.1, and 20.1 percentage points respectively, relative to the R^2 of the basic (Ohlson) model presented in Table 5, Model 1 (we estimate Ohlson's basic model's R^2 using the estimated unadjusted $R^2 = 24.9$ percent).

the model to predict future performance, the managers used the data collected to track how the leading indicators deviated from the levels they deemed necessary to implement the business model. The CFO indicated, "You've got to set the level that you know." Managers explained that they intervened to ensure that the measures did not vary much from those desired levels. They described two specific cases:

(a) In some cases, leading indicators measured at a given time $t-n$ were used to provide early feedback to management, rather than to estimate operating income at time t. Using this feedback, managers sought to take corrective actions between times $t-n$ and t to achieve a desired level of operating income. The fact that these actions were not measured or incorporated in the tests of the business model led to a correlated omitted variable problem. For example, according to the CFO, the goal was to avoid any drop in gross margins. This could be done by cutting costs, by pulling low-margin reagents off the market, or by changing prices. Unless the managers kept track of their corrective actions and incorporated them into the test of the business model, their ability to learn whether the leading indicators led to future performance would be impaired.

(b) Even if MTI managers did not take corrective actions, then they constrained the leading indicators within certain ranges thought to be optimal according to their business model, limiting their predictive abilities due to lack of variation. For example, the level of R&D expenditures was chosen based on estimates of how much investment they could manage effectively. Typically, this consistently resulted in R&D expenditures in the range of 10 to 12 percent of sales. Had the managers been interested in learning whether R&D led to performance, they would have induced variability rather than stability in this leading indicator (Dye 2004).

Reflections on the Value of Testing Business Models

While the reasons that prior researchers have given for testing business models have merit, our analyses suggest that this advice should not apply universally. Not all company and business unit managers will be or should be willing to test their business models. We suggest that rational managers will assess the costs and benefits of testing their companies' business models, considering (explicitly or implicitly) the following factors. First, they will consider the *strength of their prior beliefs* (i.e., the probability $P(H_A)$ that the managers assign to the belief that the assumptions underlying their business models are correct). On the one hand, the benefits expected by managers with a high $P(H_A)$ would be limited, as they would expect to find evidence consistent with the business model already implemented in their companies (H_A) instead of evidence that would suggest a flawed business model that could lead them to improve their actions. On the other hand, the expected costs for managers with strong prior beliefs would be high because: (1) the cost of taking actions different from those suggested by the business model—to induce variation in the data and be able to test the model—would be perceived to be high, and (2) the statistical power required to alter the managers' confidence in pursuing the business model would also be high, requiring a rich dataset to conduct the tests. Second, the managers will consider the *data available* from the firm. For example, if the statistical power required to test the business model is higher than the power that could be obtained with the data available, then the managers will have to consider the cost and feasibility of gathering additional data. Similarly, if a key component of the company's business model such as employee satisfaction is not measured, then the cost of measuring this construct will affect the manager's decision to test or not test the business model. Third, managers will consider the *opportunity costs of implementing the business model.* The expected gains from testing the business model will decrease when the benefit of pursing the business model, if it is correct (H_A is true), is high relative to the benefit of pursing the best alternative use of the firm's resources, and will increase if the payoff of pursing the business model, if incorrect (H_0 is true), is low relative to the payoff of pursing the best alternative use of the firm's resources. Finally, managers will consider the *direct cost of conducting the empirical tests.* Many companies will require assistance from a consulting firm.

While the Bayesian inference framework is undoubtedly a simplification or an approximation of how real managers incorporate the results of statistical tests into their beliefs and how they might decide whether to test their companies' business models, it yields qualitative insights that are consistent with the responses of MTI's managers. The managers at MTI stated that they were highly confident in their business model well before the model was subjected to statistical validation. They did not seek to use their data to test their business model, but instead strove to achieve consistency in their measures (to conform to what were perceived to be "optimal" standards) and to take corrective actions whenever necessary. They were not contemplating any alternative courses of action that would have persuaded them to either induce variation in their performance measures or collect additional information to test the business model. The expectation that a statistical test would have materially influenced the managers' confidence in the business model was low, and such tests would have required higher statistical power than the available data allowed.

This way of viewing the management judgment issues might also explain apparent contradictions between previous studies regarding the usefulness of testing business models. They might explain why testing the business model in the convenience store chain analyzed by Campbell et al. (2008), the department stores (Sears) analyzed by Rucci et al. (1998), and the retail bank (TD Canada Trust) described by Campbell (2008), were interpreted as beneficial exercises. First, in all of these firms, the managers were uncertain about their business models (i.e., their $P(H_A)$s were relatively low). Thus, the expectation that the tests would have been informative to the managers was high. Second, the scale of operations for all these firms (especially Sears and TD Canada Trust) was high, suggesting high payoffs (relative to the testing costs) for understanding the "correct business model." Third, in contrast with MTI, which operated a single business unit and had a long business cycle, all of these firms had performance measurement systems that collected comparable panel data across large numbers of relatively homogeneous business units operating in short business cycles. Therefore, the data necessary to conduct tests with high statistical power and high confidence levels were readily available. It is possible that the expected benefits of testing the business models at these firms declined after the managers started to pursue specific goals. For example, the managers at TD Canada Trust introduced incentives that rewarded employees for achieving optimal levels of customer satisfaction according to the business plan. A bonus cap was established at the point where an increase in the level of customer satisfaction no longer yielded greater financial returns. These incentives might have led to stable customer satisfaction levels, which would make them more difficult to relate to financial performance through statistical tests.

The insights we gain by viewing this issue through a Bayesian lens might also help to explain why the managers in the company analyzed by Malina et al. (2007) were so reluctant to update their beliefs, despite the lack of statistical support for the distributor balanced scorecard. According to Malina et al. (2007), the managers' reluctance to update their beliefs was explained because the relations in the distributor balanced scorecard were viewed as "finality relationships" (i.e., relations explained by a purpose rather than a cause), and were not meant to be validated by using statistical tests. While we do not intend to refute Malina et al.'s (2007) interpretation, our Bayesian framework offers an alternative explanation to that proposed by them. We conjecture that the managers may have placed little weight on the results of a test of the business model because (1) the managers were confident in their business model and appeared to be more interested in implementing than in testing the model, and (2) the data available for the tests described an unstable period where different business units merged with each other, generating a heterogeneous dataset unlikely to produce a high powered test.

Ultimately, whether the Bayesian interpretation provides an alternative explanation for the findings reported by Malina et al. (2007) is a philosophical question, which cannot be resolved empirically. Whether a relationship is characterized as a "causal relation" or a "finality relation" (and, hence, whether it can be tested using statistical methods) depends on the researcher's *ex ante* methodological viewpoint (Arbnor and Bjerke 1997, 428). The same relationship described as a "causal relation" under an analytical perspective could be described as a "finality relation" by a researcher adopting a systems perspective, and the concepts of causality and finality can only be fully understood in the context of the methodological view to which each belongs (Arbnor and Bjerke 1997, 438).[14] Therefore, while Malina et al.'s (2007) reported findings appear to be consistent with the Bayesian framework developed above, this conclusion need not be interpreted as a repudiation of the finality explanation these authors offer. We claim only that the examples cited above—to say nothing of the much more extensive literature testing relationships between nonfinancial performance measures and both future financial performance and/or stock returns—are a rather strong refutation of a general claim that most business model relationships cannot be tested.

Causal business models and statistical testing can provide relevant information for management decisions. Yet, under a Bayesian framework, rational managers may sometimes conclude that the expected benefits of statistical tests of their business models do not outweigh the expected costs of such tests. They may also find reasons to continue to use their models even when statistical tests have failed to provide strong confirmatory evidence for these models. That is, the patterns of apparent anomalies observed across the prior literature may conform to an entirely rational explanation.

V. DISCUSSION AND CONCLUSIONS

This study was initially designed to test the assumed cause-and-effect relationships implicit in the business model of a single business unit company. We wanted to demonstrate the power of testing business models, which is said to be valuable but rarely done, and perhaps also to suggest refinements in the methods for doing so.

We believed that the conditions for testing the business model at our research site were near ideal. We had data for over eight years for a successful company with a stable management team operating in a single line of business with a stable business strategy in a period of relatively stable environmental conditions. If ever such tests could be done successfully in a single-business-unit setting, we believed that they should have been able to be done at our research site.

We found, however, that our statistical results were weak. Our analyses provided only partial support for the company's business model. Only one of four leading indicators (instrument placements) was significantly associated with both future financial performance and stock returns, and only one of three subsections of the structural paths in the company's business model was validated with statistical significance.

We were also surprised that company managers were neither surprised nor concerned by our general lack of validation of their business model. To explain our findings, we develop several insights about the feasibility and value of testing business models in various settings. Using a simplified Bayesian framework, we explain that managers are more likely to benefit from tests of their business models when their confidence in the company's business model is weak and when the power of the statistical tests conducted is high. Confidence extends to the entire business model, i.e., the model parameters and the lags and functional forms of the various cause-and-effect relationships. When managers' confidence in the validity of their business model is high, as it was at the company we studied, it is doubtful that the statistical tests that can be conducted in a single-business-unit firm, even over an extended longitudinal period in a relatively stable operating environment, can be powerful enough to change the managers' beliefs. The available sample sizes are too small to offset insufficient variation in the data and all of the effects of the many sources of noise, such as variations in the length of the lead-lag relationships.

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[14] According to Arbnor and Bjerke (1997, 417): "[T]here are no objective and general criteria for choosing among methodological views. There are criteria, but these are valid only within a methodological view. It is, to be sure, not uncommon for proponents of the different views to claim that 'ours is best', but this can only be supported philosophically and speculatively."

If managers want to enhance their capabilities for testing their business models, then they should conduct some field experiments. They need to create greater variation in the performance drivers to be better able to observe the effects. At our research site (and at possibly all companies where the managers feel confident about their business models), however, the managers take actions explicitly designed to dampen some of the causal effects. The managers fix certain business model parameters (e.g., R&D investments) at what they consider to be optimal, manageable levels, and they take corrective actions to reduce the longitudinal variance in some other key parameters (e.g., gross margins) to achieve desired income levels. These actions further diminish the potential power of the statistical tests.

In retrospect, then, we now understand that our research site was not ideal for demonstrating the value of testing a business model. To maximize the potential for demonstrating that value, in addition to finding the conditions that we sought—e.g., data availability; and stable strategy, management team, and business conditions—researchers should seek sites where managers' confidence in their model is low and where they take actions to induce greater variation in the performance drivers.

In that we study only one firm, we recognize that the extent to which our results generalize to other businesses might be limited. Nevertheless, we believe that this study provides new insights and suggests new opportunities for future research.

More research is necessary to understand when and how business models are and should be tested. Future studies should examine whether managers (including those in financially successful firms) respond to the conditions affecting the value, power, and costs of the tests. The managers' initial confidence in their business models is probably a major determinant of the perceived *value* of the tests, so that variable should affect both the likelihood that the managers will test their models and the benefits they perceive from conducting such tests. Managers' confidence can be measured using either survey or interview research methods. We also need to learn more about how these beliefs are formed, whether they are reasonably accurate, and what might be done if they are not accurate (e.g., if they reflect management bias or overconfidence). The *power* of the tests is affected both by the setting (e.g., stability of economic conditions, quality of data) and by the managers' actions (e.g., their choice to create or dampen variation in the performance drivers). It might also be affected by choices in the level of analysis. At our research site, for example, at least in theory, major portions of the business model could be tested at the instrument, reagent, region, or customer level, rather than at the consolidated company level. The *direct costs* of conducting business model tests are likely to be highly idiosyncratic, but they should be considered as they affect the net benefits of conducting such tests.

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Voluntary Audits versus Mandatory Audits

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ABSTRACT: Exploiting a natural experiment in which voluntary audits replace mandatory audits for U.K. private companies, we analyze whether imposing audits suppresses valuable information about the types of companies that would voluntarily choose to be audited. We control for the assurance benefits of auditing to isolate the role signaling plays by focusing on companies that are audited under both regimes. These companies experience no change in audit assurance, although they can now reveal for the first time their desire to be audited. We find that these companies attract upgrades to their credit ratings because they send a positive signal by submitting to an audit when this is no longer legally required. In contrast, companies that dispense with being audited suffer downgrades to their ratings because avoiding an audit sends a negative signal and removes its assurance value.

Keywords: *voluntary audits; mandatory audits; credit ratings.*

Data Availability: *All data are available from public sources.*

I. INTRODUCTION

Requiring independent audits is an important policy mechanism available to governments to regulate the supply of reliable accounting information to investors (Barton and Waymire 2004). Information is a public good and, as with all public goods, there is a concern that too little would be supplied under private contracting.[1] According to this market

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[1] Firms operating in an unregulated environment, understandably, focus on their own costs and benefits without considering the socially optimal level of disclosure. Zingales (2009) stresses that firms disclose sub-optimally because firm-level benefits from disclosure are smaller than the society-level benefits. Given that the private and social values of information can diverge, regulation is frequently justified on the grounds that this induces positive externalities (e.g., Dye 1990; Admati and Pfleiderer 2000; Lambert et al. 2007). However, other theory implies that, rather than maximizing social welfare, mandating disclosure of accounting information can generate negative externalities (e.g., Fishman and Hagerty 1989). Leuz and Wysocki (2008) review this literature.

failure argument, companies should be compelled to have their financial statements audited to ensure that outsiders have access to reliable accounting information. In the other direction, requiring audits suppresses the signal that is conveyed when companies exercise their discretion in choosing whether to be audited (e.g., Watts 1977; Chow 1982; Melumad and Thoman 1990; Sunder 2003). We provide empirical evidence on the merits of these competing arguments by analyzing economic outcomes for private companies stemming from a regime switch from mandatory to voluntary audits.

Prior research seldom examines the situation in which audits are purchased voluntarily, although there are exceptions. Blackwell et al. (1998) find that debt pricing is cheaper for private companies whose financial statements are voluntarily audited rather than unaudited. Similarly, there is evidence that privately held companies have their financial statements audited in order to obtain loans (Allee and Yohn 2009). Importantly, these prior studies compare voluntarily audited companies with unaudited companies. To our knowledge, ours is the first study to directly compare voluntary audits with mandatory audits. In a natural experiment, we analyze a regime change from mandatory to voluntary auditing for privately held companies in the United Kingdom. The purpose of our analysis is to isolate whether this regime change permitted firms to signal new information about their types.

Requiring audits makes it more difficult for companies to convey their types through their decision on whether to appoint an auditor. In Melumad and Thoman's (1990) theory, companies pursuing loans choose whether to submit to an audit. The economy in their set-up is composed of companies with unobservable risk types. Lenders then draw rational inferences about a company's type, conditional on its decision of whether to purchase an audit. Melumad and Thoman (1990) demonstrate that some companies elect to hire auditors because lenders conclude that only the high-risk types of borrowers would choose not to be audited. In other words, the decision to hire an auditor is informative, as it indicates that the company is more likely to be a low-risk type. In contrast, avoiding an audit divulges to lenders that the company is more likely to be a high-risk type. In their stylized model, costly auditing permits a separating equilibrium in which only the low-risk types of borrowers appoint auditors. It follows that the company's decision to appoint (not appoint) an auditor sends an incrementally positive (negative) signal about its credit risk, holding constant any assurance benefits provided by an audit.

External audits are imposed on all publicly traded companies in the U.S. and the U.K., although these countries differ in their policies toward private companies. In contrast to the U.S., where audits of private companies remain voluntary, they were mandatory for all U.K. private companies until 1994, at which point they became voluntary for very small private companies. Audits subsequently became voluntary in the U.K. for larger private companies in 2004. We exploit the more recent change in the audit requirement that permits larger private companies to opt out of an audit for the first time in 2004. For each company in our sample, audits were mandatory in 2003 and voluntary afterward.

Our primary contribution, made possible by the U.K. regime change, is to isolate whether the switch to voluntary auditing in 2004 yields incrementally valuable information about the company's type beyond what could already be surmised during the mandatory regime. We focus on the inferences drawn by a credit rating agency because their ratings are a major source of information for lenders. Ratings are assigned to virtually all private companies in the U.K. by Qui Credit Assessment Limited.[2] We expect that the credit rating agency partly infers the company's type by observing its choice of whether to be audited.

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[2] Later, we outline prior research validating that Qui's ratings reliably capture borrower credit quality.

To gauge whether voluntary audits reveal new information about borrowers' types, we examine the changes in credit ratings after the transition from mandatory to voluntary audits. This unique setting enables us to distinguish between the assurance and signaling benefits of an audit. In particular, when a company voluntarily chooses to remain audited, there is no change in audit assurance because the company is audited under both the mandatory and voluntary regimes. However, such a company transmits a positive signal when it chooses to be audited voluntarily. Consequently, to the extent that a voluntary audit communicates the company's low-risk type, we expect to observe an increase in credit ratings for the companies that elect to remain audited.

We stress that our empirical predictions do not rest on the highly stylized modeling in Melumad and Thoman (1990), where every audited (unaudited) company is a good (bad) type. Rather, our predictions are grounded in the more general premise that, everything else constant, the low-risk (high-risk) types have stronger (weaker) incentives to be audited (Titman and Trueman 1986). Accordingly, the decision on whether to be audited sends a signal about the *average* type of company making that choice, although the signal is not necessarily indicative of every company's true type. For example, a low-risk type may abandon an audit when this becomes permissible if it does not require additional financing, which more credible financial statements can facilitate.[3] In this situation, the company could rationally conclude that the cost of the audit outweighs its benefits. The upshot is that the decision on whether to be voluntarily audited becomes an informative, albeit noisy, indicator of the company's true type when auditing is no longer mandatory.[4]

In regressions that control for company characteristics and macroeconomic conditions, we provide strong, robust evidence that credit ratings rise for companies that continue being audited during the first year of the voluntary regime. We interpret this evidence as implying that these companies enjoy ratings upgrades because their decision to remain audited conveys an incrementally positive signal about their credit risk. The level of audit assurance appears stable for these companies during the transition from mandatory to voluntary audits, insofar as we find that their audit fees and auditor choices do not change following the regime switch.

We also examine the impact of the regime switch on credit ratings for the companies that choose to opt out of the audit. For these companies, the decision to abandon the audit not only communicates that the company is more likely to be a high-risk type of borrower, but also sacrifices the assurance that had been provided under the mandatory regime. For both reasons, we expect that ratings decline for companies that dispense with an audit when this becomes permissible. Consistent with this prediction, we find that credit ratings drop when companies abandon the audit, which conveys a negative signal about their type and reduces financial reporting credibility; i.e., both signaling and the drop in assurance are responsible for their ratings falling.

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[3] Although some research indicates that banks often will only grant loans to private companies that supply audited financial statements (e.g., Allee and Yohn 2009), banks also rely heavily on their debt monitoring and customer relationship activities to collect information on borrowers (e.g., Diamond 1984; Fama 1985; Petersen and Rajan 1994; Berger and Udell 1995). Reinforcing that signaling remains imperfect even under the voluntary regime, some low-risk types may abandon an audit when this becomes permissible in 2004 if, for example, they can borrow without submitting to an audit because the bank protects its interests through direct monitoring (Diamond 1991; Rajan 1992; Rajan and Winton 1995; Ang et al. 2000; Houston and James 2001). This is another situation in which a low-risk type of company rationally elects to avoid an audit after evaluating the tradeoffs.

[4] Companies would choose to be audited when the economic benefits of continuing to subject their financial statements to an external audit exceed the cost. Importantly, the signaling motive is only one possible reason for a company's choice on whether to remain audited when this is no longer required by law. For example, a company may choose to remain audited if it sufficiently values the business advice provided by the auditor (e.g., Chow 1982). Similarly, supplying audited financial statements may be a condition for a private company to secure debt financing. Accordingly, the company's decision to be voluntarily audited amounts to a noisy, rather than a perfect, signal of its underlying type.

Our evidence on credit ratings is summarized as follows. During the mandatory regime, the companies that later choose to be audited receive credit ratings that are approximately eight percentage points higher than companies that choose not to be audited. After auditing becomes voluntary, the companies that remain audited receive a further two-point boost to their ratings, while unaudited companies suffer a four-point reduction. Consequently, the spread in credit ratings widens following the switch away from mandatory audits because the ratings agency is better able to distinguish borrowers' types. During the voluntary regime, the audited companies receive credit ratings that are 14 points higher than the unaudited companies. This is comprised of the initial spread during the mandatory regime (i.e., eight points) plus the increase in the spread when auditing becomes voluntary (i.e., six points). To provide some perspective on the materiality of these results, the mean (median) credit rating over our sample period is 67 (69) points on a 100-point scale.[5] Collectively, our evidence suggests that the switch to voluntary auditing had a first-order economic impact on credit ratings.

Our study is the first to isolate that the voluntary purchase of an audit generates new information about the company's type, holding constant the assurance value that stems from having the financial statements audited. Extant evidence indicates that audited companies enjoy less costly debt financing and less credit rationing than do companies that are not audited (Blackwell et al. 1998; Allee and Yohn 2009). However, this does not resolve whether voluntary audits facilitate signaling, because the benefits from being audited rather than unaudited are almost certainly partly attributable to the value of audit assurance. Accordingly, research to date does not fully disentangle whether the benefits of voluntary audits stem from a positive signal or from audit assurance.[6] In contrast, we identify the signaling value of voluntary audits by exploiting an experimental setting in which the regulatory regime switches from mandatory to voluntary auditing. Specifically, the companies that voluntarily choose to continue with the audit undergo no change in audit assurance because they are audited in both regimes, although these companies send a positive signal under the voluntary regime by choosing to retain their auditor.

Our analysis provides empirical support for the argument that the mandatory requirement suppresses information that is conveyed when companies are allowed to choose whether to be audited (Melumad and Thoman 1990; Sunder 2003). Moreover, additional tests indicate that the opt-out companies were only passively complying with the audit requirement—evident in their attempts to reduce costs through auditor choice and fees—under the mandatory regime. In other words, it is difficult to force companies to privately contract for stringent audits if they would choose not to be audited voluntarily. However, we caution that our research on private companies cannot contribute valid insights on the relative merits of voluntary and mandatory audits for public companies.

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[5] In another way to gauge economic importance, we evaluate the influence of the upgrade (downgrade) of two (four) points for companies that keep (abandon) the audit on the credit rating agency's assignment of companies to five broad risk categories. We find that 13.7 percent of the companies in our sample move up a major category after attracting two additional points by remaining audited in 2004. In contrast, 19.2 percent move down to a lower category after losing four points by opting out of an audit when this becomes permissible.

[6] Extant evidence from the audit fee literature suggests that audits by the Big 4 firms are more valuable than those provided by non-Big 4 firms, although past studies have not attempted to disentangle whether this is attributable to a positive signal from hiring a more costly Big 4 audit firm. For example, the fee premiums earned by Big 4 firms might reflect greater audit assurance rather than a positive signal.

Section II outlines prior theory and evidence in developing our hypotheses. Section III covers our research design, while Section IV describes our results. Section V concludes.

II. HYPOTHESES DEVELOPMENT

The objective of this study is to shed light on the importance of different legal requirements governing audits. The rationale behind regulators imposing mandatory audits is that companies have insufficient private incentives to voluntarily provide reliable financial information.[7] Reflecting that mandatory auditing may be socially optimal, theory implies that information underproduction can arise because of positive externalities (e.g., Dye 1990; Admati and Pfleiderer 2000) and because financial statements constitute a public good that will be under-supplied in a free market (e.g., Gonedes and Dopuch 1974; Beaver 1998). The arguments in favor of regulation rather than the free market were influential in the U.K., where private companies are required to make their financial statements publicly available and, until recently, those statements also had to be independently audited (Aranya 1974; Dedman and Lennox 2009). On the other hand, it remains unclear whether private incentives for the demand and supply of audits are insufficient, particularly as private markets for other forms of certification services are ubiquitous in the economy (Jamal and Sunder 2008). Moreover, voluntarily submitting to an audit enables companies to credibly communicate their types, whereas mandatory audits deprive investors of this signal.

Private companies provide an opportune setting for analyzing the assurance and signaling benefits of auditing, given that their information structure is typically poor relative to public companies. For example, Brav (2009) holds that debt contracting is more sensitive to information for private companies than for their public counterparts. Reinforcing that this testing ground suits our inquiry, Fenn (2000) and Santos (2006) report that lenders demand higher yields on private companies' debt to compensate for the worse information asymmetry that they suffer.[8] This evidence squares with Graham et al.'s (2005) finding from a survey of chief financial officers that—compared with public companies—private companies are more inclined to manipulate earnings to preserve their credit ratings and to avoid violating bond covenants, rendering their financial statements less informative for the debt contracting process. It follows that the links between auditing and credit ratings are likely to be strong in private companies, increasing the power of our tests.

Analyzing credit ratings maps into our research questions that focus on the benefits of auditing under the mandatory and voluntary regimes.[9] Prior research shows that perceptions of information risk affect credit ratings and that reliable accounting numbers facilitate debt contracting (e.g., Watts 1977; Smith and Warner 1979; Leftwich 1983; Francis et al. 2005; Yu 2005). This is particularly relevant to U.K. private companies that rely heavily on trade credit and other forms of loan financing (Brav 2009). In fact, prior research finds that companies relax accounting-based covenants by managing their earnings through accounting changes (Sweeney 1994) and discretionary accruals (DeFond and Jiambalvo 1994). Moreover, recent research uses credit ratings to measure the perceived benefits of Big 4 versus non-Big 4 audits (e.g., Mansi et al. 2004), including in private companies (e.g., Fortin and Pittman 2007). Another upside to analyzing credit ratings is that the data are publicly available even for companies that have no debt in their capital structures.

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[7] Importantly, Dye (1990) and Leftwich (2004), among others, stress that advocates for mandatory financial reporting do not argue that firms will supply no information unless compelled or that managers' incentives are irrelevant to reporting decisions. Indeed, the reduction in agency (Jensen and Meckling 1976), information (Botosan 1997), and liquidity (Welker 1995) costs can convince managers to divulge high-quality information voluntarily.

[8] Similarly, Pagano et al. (1998) report that firms' borrowing costs fall after going public, which they attribute to the greater accounting transparency that ensues. Indeed, Givoly et al. (2010) report that public firms have more conservative earnings than private firms. Prior research implies that debt contracting is partly responsible for the demand for conservative financial reporting (e.g., Leftwich 1983; Holthausen and Watts 2001).

[9] The demand for voluntary audits predates regulations requiring audits. Companies have been voluntarily appointing independent auditors since at least the 13th century (Watts and Zimmerman 1983), which implies that the private benefits of auditing often exceed their costs. Benston (1969) reports that 82 percent of U.S. public companies purchased audits shortly before the Securities Acts of 1933 and 1934, which introduced mandatory auditing of financial statements. Chow (1982) examines the voluntary audit decision made by large U.S. public companies in 1926.

In our two hypotheses, we consider how companies' credit ratings change after auditing is no longer mandatory. We expect that the switch from mandatory to voluntary audits allows companies to better reveal their types through their choice on whether to subject their financial statements to an external audit. Our identification strategy exploits the U.K. private company setting in order to provide insight on whether companies experience an increase in their credit ratings when they elect to remain audited under the voluntary regime. In the absence of an audit requirement, a company can incur the cost of engaging an auditor to signal to outsiders that it is more likely to be a low-risk type.[10] More formally, Melumad and Thoman's (1990) theory implies that the decision to hire an auditor conveys useful information about the company's type when audits are voluntary. A mandatory audit regime prevents outsiders from learning more about a company's type by observing its decision on whether to have an audit. Requiring audits prevents companies from exploiting this signaling mechanism, although they can partly reveal their type through auditor choice even when auditing is mandatory.

Under the voluntary regime, a company that continues to pay the cost of the audit is able to signal that it is more likely to be a low-risk type. In our sample, the audit fee is a material expense relative to the profits that the companies generate.[11] Consequently, the decision to bear the cost of an audit enables the low-risk types to better differentiate themselves from the high-risk types. Importantly, the assurance value of an audit remains constant for companies that are audited in *both* the mandatory and voluntary regimes. Therefore, any change in the credit rating caused by the switch from mandatory to voluntary audits will be attributable to a signaling effect rather than a change in audit assurance. Given the positive signal stemming from the decision to remain audited, we predict that companies enjoy an upgrade to their ratings if they choose not to opt out:

> **H1:** Credit ratings rise for companies that switch from mandatory audits to voluntary audits.

For two reasons, we expect that credit ratings drop for companies that choose to stop being audited. First, their decision to opt out conveys a negative message because outsiders are able to more clearly distinguish between them and the types of companies that choose to be audited voluntarily. Second, by foregoing the audit, these companies lose any assurance benefits that existed when they were audited involuntarily during the mandatory regime. These dynamics are behind our second prediction:

> **H2:** Credit ratings fall for companies that switch from mandatory audits to no audits.

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[10] However, we concede that another perspective holds that high-risk companies may submit to an audit to signal their commitment to refrain from diverting corporate resources from lenders (see discussion in Fan and Wong [2005]).

[11] The median company in our sample pays audit fees of £4,000 and earns operating profits of £78,000 during the final year of the mandatory regime. We expect that this audit cost will dissuade some companies, particularly the high-risk types, from continuing with the audit in 2004.

III. RESEARCH DESIGN

Transition from the Mandatory to the Voluntary Regime

We test the predictions in H1 and H2 by estimating a model that explains credit ratings in the final year of the mandatory regime (2003) and the initial year of the voluntary regime (2004) for the companies that keep the audit and the companies that opt out of the audit:[12]

$$RATING_{it} = \mu_0 + \mu_1 OPTOUT_i + \mu_2 OPTOUT_i \times SWITCH_t + \mu_3 SWITCH_t + \mu_4 X_{it} + w_{it}, \quad (1)$$

where:

$RATING_{it}$ = company i's credit rating in year t;
$OPTOUT_i$ = 1 if company i chooses not to be audited, and 0 if company i chooses to be audited;
$SWITCH_t$ = 1 if audits are voluntary ($t = 2004$), and 0 if audits are mandatory ($t = 2003$); and
X_{it} = a vector of time-varying control variables for company i.

In this set-up, $OPTOUT_i$ takes the value 1 in both 2003 and 2004 if the company opts out of the audit once it ceases to be mandatory; $OPTOUT_i$ equals 0 in both years if the company keeps the audit. (There is no time subscript, t, on the $OPTOUT_i$ variable because its values have the same coding in each year.) The effect of the switch from mandatory to voluntary audits is captured through the time-varying regime switch variable, $SWITCH_t$, which equals 1 for every company in 2004, and 0 for every company in 2003.

To clarify the intuition for the coefficients in Equation (1), we illustrate the model's predictions for the two types of company in each regime. For companies that keep the audit, credit ratings are determined by setting $OPTOUT_i$ equal to 0 in Equation (1):

$$RATING_{it} = \mu_0 + \mu_3 SWITCH_t + \mu_4 X_{it} + w_{it}.$$

We expect under H1 that credit ratings will rise for companies that remain audited when this becomes voluntary in 2004 because electing to have an audit conveys incremental information about the company's lower credit risk. Although these companies experience no change in audit assurance, their decision to be audited voluntarily conveys a positive signal about their risk types when audits are no longer compulsory. Consequently, we predict that $\mu_3 > 0$.

For companies that opt out of the audit, credit ratings are determined by setting $OPTOUT_i$ equal to 1 in Equation (1):

$$RATING_{it} = \mu_0 + \mu_1 + (\mu_2 + \mu_3)SWITCH_t + \mu_4 X_{it} + w_{it}.$$

Abandoning an audit indicates both that the company is of greater credit risk and also removes the assurance value that accompanies an audit. Both effects are expected to lead to lower credit ratings for the companies that opt out of the audit in 2004. Therefore, we predict under H2 that $\mu_2 + \mu_3 < 0$. In summary, we predict that $\mu_3 > 0$ (H1) and $\mu_2 + \mu_3 < 0$ (H2) in Equation (1).

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[12] We focus on the regime switch in 2004 rather than the one in 1994 because by 2004, the credit rating agency whose ratings we analyze had accumulated ten years of experience in assessing the credit risks of audited and unaudited companies. In any event, we cannot examine the effect of the 1994 change in regulation because our data source provides financial statement information for the most recent ten years only.

Control Variables

Our set of control variables (X_{it}) follows recent research on the determinants of credit ratings (e.g., Ashbaugh-Skaife et al. 2006; Fortin and Pittman 2007):

AGE_{it} = company i's age in year t;
LTS_{it} = log of total sales;
LTA_{it} = log of total assets;
$INTCOV_{it}$ = interest expense divided by earnings before interest and taxation. The $INTCOV_{it}$ ratio is capped at an upper bound of 2.00 to handle outliers, and we assign a value of 2.00 to the $INTCOV_{it}$ ratio if earnings are non-positive;[13]
$LIQUIDITY_{it}$ = (current assets − inventory) divided by current liabilities; and
$LEVERAGE_{it}$ = total liabilities divided by total assets.

Following prior research, we expect that credit ratings are higher for companies that are older (AGE_{it}), larger (LTS_{it} and LTA_{it}), have greater interest coverage ($INTCOV_{it}$), higher liquidity ($LIQUIDITY_{it}$), and lower leverage ($LEVERAGE_{it}$).

Sample Formation and Description

The U.K. has long diverged from the U.S. by requiring private companies to have their financial statements audited.[14] However, in an effort to reduce the burden of regulation, the U.K. made it permissible after 1994 for private companies to avoid having an audit if their sales did not exceed £1m and their total assets did not exceed £1.4m. A subsequent amendment to the Companies Act relaxed these size thresholds, allowing more private companies to qualify for the audit exemption. Specifically, companies with fiscal years ending after January 30, 2004, were allowed to avoid an audit if their sales did not exceed £5.6m and total assets did not exceed £2.8m. This shift in exemption eligibility thresholds enables us to assemble a sample of companies that were affected by the regime switch in 2004.

We compile the sample from the Financial Analysis Made Easy (FAME) database. All public companies must be audited, regardless of their size, so we require that each sample company is private. For companies belonging to a group, auditor hiring decisions are routinely made by the ultimate owner rather than at the company level, so we impose the restriction that the company is independent; i.e., it does not belong to a corporate group. To ensure that each private company was required to undergo an audit prior to January 30, 2004, we select companies for which sales $\geq$ £1m and total assets $\geq$ £1.4m in 2003. Next, we confine the sample to companies that qualified for the audit exemption after January 30, 2004 (i.e., sales $\leq$ £5.6m and total assets $\leq$ £2.8m). Certain types of regulated companies—insurance companies, investment advisors, mortgage arrangers, trade unions, and employers' associations—are required to have an audit even if they fall within these size thresholds, so we exclude these companies from the sample. Finally, we require that financial statement data are available for both the year prior to January 30, 2004, and the next year. After applying these data screens, we are left with 5,139 unique companies. By design, each company in the sample was required to have an audit in 2003, but not in 2004. There are two observations per company, with the first pertaining to the final year of the mandatory audit regime (2003) and the second to the initial year of the voluntary regime (2004). Of the 5,139 companies, 3,440 (67 percent) remain audited in the first year of the voluntary regime, while 1,699 (33 percent) choose to become unaudited once this option becomes available.

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[13] In specifying *INTCOV*, we follow prior research that caps variables based on accounting ratios that can suffer from small denominators or negative values for earnings (e.g., Dechow 1994; Petersen and Rajan 1994; Efendi et al. 2007). Although companies that generate more cash from their operations are in a better position to service their debts, data constraints prevent us from analyzing whether our core results are sensitive to replacing this income-based interest coverage measure with one based on cash flows from operations. However, prior research examining the determinants of credit ratings, including for private companies (e.g., Petersen and Rajan 1994; Fortin and Pittman 2007), routinely controls for interest coverage with an income-based measure. Our regressions control for the company's cash holdings using the *LIQUIDITY* variable.

[14] More generally, this setting is unique in other ways, including that both private and public companies must publicly file annual financial statements that follow the same accounting standards in order to comply with U.K. disclosure regulations. Similarly, both types of companies are subject to the same tax laws in the U.K.

Descriptive Statistics

Table 1 documents the industry composition of the sample companies. There are 1,414 companies (26.3 percent) operating in the business services sector and 1,221 (23 percent) in the wholesale and retail trade sector. Other industries that are well represented include construction (748 companies) and manufacturing (719 companies). Our research design controls for differences between industries by specifying indicator variables for each industry sector.

The credit rating scores issued by Qui Credit Ltd. are provided in the FAME database. Ratings are on a numerical scale between 0 and 100 that quantifies the agency's assessment of the likelihood of corporate failure within the next 12 months. The $RATING_{it}$ variable corresponds to the company's credit score, with higher ratings representing a lower perceived risk of financial failure.

Table 2 presents descriptive statistics for 2003 (the final year of the mandatory regime) and 2004 (the first year of the voluntary regime). The motivation for this analysis is to investigate whether there are important changes in the macroeconomic environment or other time-varying factors that could confound the comparison of credit ratings in the two regimes. The first row of Table 2 shows that the mean credit rating increases from 64.51 in 2003 to 68.37 in 2004. This ratings improvement is highly significant ($p < 0.01$) and is consistent with a general improvement in the economic environment between 2003 and 2004. Further, we find a significant improvement in liquidity between 2003 and 2004 ($p < 0.01$).

Given the evidence in Table 2 that economic conditions improved between 2003 and 2004, we control for the resulting increase in credit ratings by subtracting the sample mean values of credit ratings in each year. For example, we measure the deviation between company *i*'s credit rating in 2003 and the mean rating given to every other company in 2003 ($RATING_{i2003} - RATING_{2003}$).

TABLE 1

Industry Composition of the Sample Companies

U.K. SIC Code	Industry	Companies
0001–0999	Agriculture, hunting, forestry, and fishing	79
1000–1499	Mining	12
1500–3999	Manufacturing	719
4000–4499	Electricity, gas, and water supply	3
4500–4999	Construction	748
5000–5499	Wholesale and retail trade	1,221
5500–5999	Hotels and restaurants	148
6000–6499	Transport, storage, and communication	338
7000–7499	Business services	1,414
7500–7999	Public services and defense	3
8000–9999	Other service activities	454
	Total	5,139

TABLE 2

Variable Means during the Final Year of the Mandatory Audit Regime (2003) and the First Year of the Voluntary Audit Regime (2004)

	Mandatory Audit Regime ($SWITCH_t = 0$)		**Voluntary Audit Regime ($SWITCH_t = 1$)**		
	Observations	**Mean**	**Observations**	**Mean**	**t-statistics for Differences in Means**
$RATING_{it}$	5,139	64.51	5,139	68.37	9.32***
$INTCOV_{it}$	5,139	0.48	5,139	0.46	−1.03
LTS_{it}	5,139	7.36	5,139	7.33	−1.31
LTA_{it}	5,139	6.82	5,139	6.84	1.07
$LIQUIDITY_{it}$	5,139	1.48	5,139	1.58	2.73***
$LEVERAGE_{it}$	5,139	0.70	5,139	0.69	−0.52

*, **, *** Statistically significant at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed).
The $LIQUIDITY_{it}$ and $LEVERAGE_{it}$ variables are winsorized because otherwise they would suffer from outliers. The other variables do not need to be winsorized as they do not suffer from outliers.

Variable Definitions:
$RATING_{it}$ = the credit score (from 1 to 100, where a higher score implies a better rating) for company *i* in year *t*;
$SWITCH_t$ = 1 if audits are voluntary (2004), and 0 if audits are mandatory (2003);
$INTCOV_{it}$ = interest expense divided by earnings before interest and taxation (the $INTCOV_{it}$ ratio is capped at 2.00, and we assign a value of 2.00 if earnings before interest and taxation is negative);
LTS_{it} = log of total sales (£000);
LTA_{it} = log of total assets (£000);
$LIQUIDITY_{it}$ = quick ratio ((current assets − inventory)/current liabilities);
$LEVERAGE_{it}$ = total liabilities divided by total assets;
LAF_{it} = log of audit fees (£000); and
$BIG4_{it}$ = 1 if the company is audited by a Big 4 audit firm, 0 otherwise.

We similarly measure the cross-sectional variation in credit ratings during 2004 using the variable $RATING_{i2004} - RATING_{.2004}$.[15] Likewise, we purge all control variables of any yearly effects ($X_{it} - X_{.t}$), such that the modified credit ratings model in Equation (1) becomes:

$$\begin{aligned} RATING_{it} - RATING_{.t} = {} & \mu_0 + \mu_1 OPTOUT_i + \mu_2 OPTOUT_i \times SWITCH_t + \mu_3 SWITCH_t \\ & + \mu_4(AGE_{it} - AGE_{i.}) + \mu_5(LTS_{it} - LTS_{i.}) + \mu_6(LTA_{it} - LTA_{i.}) \\ & + \mu_7(INTCOV_{it} - INTCOV_{i.}) + \mu_8(LIQUIDITY_{it} - LIQUIDITY_{i.}) \\ & + \mu_9(LEVERAGE_{it} - LEVERAGE_{i.}) + w_{it}. \end{aligned} \qquad (1')$$

Table 3 presents a correlation matrix for the variables in our study. Consistent with past research, we find that credit ratings are significantly higher for companies that are older, larger, and have better liquidity, whereas they are lower for companies that have worse interest coverage and

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[15] In our study, H1 is more important than H2 because H1 involves the companies for which we are able to isolate the role that signaling plays in shaping credit ratings, whereas H2 involves the companies for which we cannot isolate the signaling effect from the assurance effect. Given that H1 is relatively more important, we take a conservative approach in our tests by adjusting credit ratings downward in 2004 to adjust for the improvement in the macro-economy. This adjustment ensures that the rise in credit ratings for companies that continue being audited does not stem from an improvement in the macro-economy. Conversely, we concede that this adjustment makes our tests of H2 less conservative because the unadjusted credit ratings fall by less than the adjusted ratings.

TABLE 3

Correlation Matrix

(n = 10,278)

	1	2	3	4	5	6	7	8	9
1. $RATING_{it}$	1.000								
2. $OPTOUT_i$	**−0.270**	1.000							
3. $SWITCH_t$	**0.092**	0.000	1.000						
4. AGE_{it}	**0.265**	**−0.071**	**0.031**	1.000					
5. $INTCOV_{it}$	**−0.321**	**−0.040**	−0.010	**0.039**	1.000				
6. LTS_{it}	**0.029**	**−0.068**	−0.013	**−0.081**	**−0.084**	**1.000**			
7. LTA_{it}	**0.234**	**−0.180**	0.011	**0.212**	**0.046**	**−0.045**	1.000		
8. $LIQUIDITY_{it}$	**0.156**	−0.025	**0.027**	**0.096**	**−0.055**	**−0.314**	**0.131**	1.000	
9. $LEVERAGE_{it}$	**−0.269**	**0.057**	−0.005	**−0.180**	**0.116**	**0.113**	**−0.346**	**−0.247**	1.000

The correlations shown in bold are statistically significant at the 1 percent level.
The $LIQUIDITY_{it}$ and $LEVERAGE_{it}$ variables are winsorized because otherwise they would suffer from outliers. The other variables do not need to be winsorized, as they do not suffer from outliers.

Variable Definitions:
$RATING_{it}$ = the credit rating score (from 1 to 100, where a higher score implies a better rating) for company i in year t;
$OPTOUT_i$ = 1 if company i chooses to opt out of the audit, and 0 if company i continues to be audited;
$SWITCH_t$ = 1 if audits are voluntary (2004), and 0 if audits are mandatory (2003);
AGE_{it} = the age of company i in year t;
$INTCOV_{it}$ = interest expense divided by earnings before interest and taxation (the $INTCOV_{it}$ ratio is capped at 2.00, and we assign a value of 2.00 if earnings before interest and taxation is negative);
LTS_{it} = log of total sales (£000);
LTA_{it} = log of total assets (£000);
$LIQUIDITY_{it}$ = quick ratio ((current assets − inventory)/current liabilities); and
$LEVERAGE_{it}$ = total liabilities divided by total assets.

higher leverage. This supports the evidence in Doumpos and Pasiouris (2005) that Qui's credit ratings are accurate indicators of default risk. The other correlations are also as expected; e.g., older companies tend to have higher leverage because they are better known by lenders.

IV. RESULTS

Univariate Evidence

Table 4, Panel A, reports descriptive statistics for 2003 and 2004, focusing on the 3,440 companies that remain audited following the regime switch. The first three rows reveal that neither the audit fees paid by these companies nor their choice of audit firm changed significantly, implying that audit assurance was stable between 2003 and 2004 for the companies that kept the audit. More importantly, Panel A shows that credit ratings are 5.00 points above the mean in 2004, but only 2.97 points above the mean in 2003. In short, the companies that voluntarily continued with an audit enjoyed an average upgrade of two points to their credit ratings, consistent with H1. Panel B reports descriptive statistics for the 1,699 companies that cease to be audited following the regime switch. We find a dramatic fall in credit ratings between 2003 and 2004 for these companies. Their mean credit rating was 6.01 points below the mean in 2003, whereas it was 10.13 points below the mean in 2004. Accordingly, consistent with H2, these companies suffered a relative downgrade of just over four points in their credit ratings.

TABLE 4

Descriptive Statistics after Partitioning the Sample by the Company's Decision on Whether to be Audited and the Prevailing Audit Regime (Mandatory Audits in 2003, Voluntary Audits in 2004)

Panel A: Companies that Keep the Audit When Auditing Becomes Voluntary ($OPTOUT_i = 0$)

	Final Year of the Mandatory Audit Regime ($SWITCH_t = 0$)		First Year of the Voluntary Audit Regime ($SWITCH_t = 1$)		t-statistics for Differences in Means
	Observations	Mean	Observations	Mean	
$BIG4_{it}$	3,440	0.08	3,440	0.07	−0.92
$Audit\ fees_{it}$ (£000)	3,440	5.68	3,440	5.80	1.09
LAF_{it}	3,440	1.52	3,440	1.53	1.17
$RATING_{it} - RATING_{.t}$	3,440	2.97	3,440	5.00	4.02***
$AGE_{it} - AGE_{.t}$	3,440	0.82	3,440	0.82	0.00
$INTCOV_{it} - INTCOV_{.t}$	3,440	0.03	3,440	0.02	−0.51
$LTS_{it} - LTS_{.t}$	3,440	0.04	3,440	0.05	0.56
$LTA_{it} - LTA_{.t}$	3,440	0.09	3,440	0.10	0.27
$LIQUIDITY_{it} - LIQUIDITY_{.t}$	3,440	0.03	3,440	0.04	0.04
$LEVERAGE_{it} - LEVERAGE_{.t}$	3,440	−0.02	3,440	−0.02	−0.41

Panel B: Companies that Opt Out of the Audit When Auditing Becomes Voluntary ($OPTOUT_i = 1$)

	Final Year of the Mandatory Audit Regime ($SWITCH_t = 0$)		First Year of the Voluntary Audit Regime ($SWITCH_t = 1$)		t-statistics for Differences in Means
	Observations	Mean	Observations	Mean	
$RATING_{it} - RATING_{.t}$	1,699	−6.01	1,699	−10.13	−6.49***
$AGE_{it} - AGE_{.t}$	1,699	−1.67	1,699	−1.67	0.00
$INTCOV_{it} - INTCOV_{.t}$	1,699	−0.05	1,699	−0.03	0.77
$LTS_{it} - LTS_{.t}$	1,699	−0.08	1,699	−0.11	0.90
$LTA_{it} - LTA_{.t}$	1,699	−0.19	1,699	−0.20	0.36
$LIQUIDITY_{it} - LIQUIDITY_{.t}$	1,699	−0.07	1,699	−0.07	0.05
$LEVERAGE_{it} - LEVERAGE_{.t}$	1,699	0.04	1,699	0.05	−0.49

Panel C: The Final Year of the Mandatory Audit Regime ($SWITCH_t = 0$)

	Companies That Keep the Audit When Auditing Becomes Voluntary ($OPTOUT_i = 0$)		Companies That Opt Out of the Audit When Auditing Becomes Voluntary ($OPTOUT_i = 1$)		t-statistics for Differences in Means
	Observations	Mean	Observations	Mean	
$BIG4_{it}$	3,440	0.08	1,699	0.02	−8.16***
$Audit\ fees_{it}$ (£000)	3,440	5.68	1,699	4.27	−11.87***
LAF_{it}	3,440	1.52	1,699	1.26	−13.32***
$RATING_{it}$	3,440	67.48	1,699	58.50	−13.64***
AGE_{it}	3,440	18.81	1,699	16.32	−5.11***

(continued on next page)

TABLE 4 (continued)

	Companies That Keep the Audit When Auditing Becomes Voluntary ($OPTOUT_i = 0$)		**Companies That Opt Out of the Audit When Auditing Becomes Voluntary ($OPTOUT_i = 1$)**		
	Observations	**Mean**	**Observations**	**Mean**	**t-statistics for Differences in Means**
$INTCOV_{it}$	3,440	0.50	1,699	0.42	−3.50***
LTS_{it}	3,440	7.40	1,699	7.28	−4.21***
LTA_{it}	3,440	6.91	1,699	6.64	−12.80***
$LIQUIDITY_{it}$	3,440	1.51	1,699	1.41	−1.87*
$LEVERAGE_{it}$	3,440	0.68	1,699	0.74	3.63***

Panel D: The First Year of the Voluntary Audit Regime ($SWITCH_t = 1$)

	Voluntarily Audited Companies ($OPTOUT_i = 0$)		**Unaudited Companies ($OPTOUT_i = 1$)**		
	Observations	**Mean**	**Observations**	**Mean**	**t-statistics for Differences in Means**
$RATING_{it}$	3,440	73.38	1,699	58.25	−28.49***
AGE_{it}	3,440	19.81	1,699	17.32	−5.12***
$INTCOV_{it}$	3,440	0.48	1,699	0.43	−2.25***
LTS_{it}	3,440	7.39	1,699	7.23	−5.47***
LTA_{it}	3,440	6.93	1,699	6.64	−13.37***
$LIQUIDITY_{it}$	3,440	1.62	1,699	1.51	−1.78*
$LEVERAGE_{it}$	3,440	0.67	1,699	0.75	4.46***

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*, **, *** Statistically significant at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed).
The $LIQUIDITY_{it}$ and $LEVERAGE_{it}$ variables are winsorized because otherwise they would suffer from outliers. The other variables do not need to be winsorized, as they do not suffer from outliers.

Variable Definitions:
$OPTOUT_i$ = 1 if company *i* chooses to opt out of the audit, and 0 if company *i* continues to be audited;
$BIG4_{it}$ = 1 if the company is audited by a Big 4 audit firm, 0 otherwise;
$BIG4_{.t}$ = the mean value of $BIG4_{it}$ across all companies in year *t*;
LAF_{it} = log of audit fees (£000);
$LAF_{.t}$ = the mean value of LAF_{it} across all companies in year *t*;
$RATING_{it}$ = the credit rating score (from 1 to 100, where a higher score implies a better rating) for company *i* in year *t*;
$RATING_{.t}$ = the mean value of $RATING_{it}$ across all companies in year *t*;
AGE_{it} = the age of company *i* in year *t*;
$AGE_{.t}$ = the mean value of AGE_{it} across all companies in year *t*;
$INTCOV_{it}$ = interest expense divided by earnings before interest and taxation (the $INTCOV_{it}$ ratio is capped at 2.00 and we assign a value of 2.00 if earnings before interest and taxation is negative);
$INTCOV_{.t}$ = the mean value of $INTCOV_{it}$ across all companies in year *t*;
LTS_{it} = log of total sales (£000);
$LTS_{.t}$ = the mean value of LTS_{it} across all companies in year *t*;
LTA_{it} = log of total assets (£000);
$LTA_{.t}$ = the mean value of LTA_{it} across all companies in year *t*;
$LIQUIDITY_{it}$ = quick ratio ((current assets − inventory)/current liabilities);
$LIQUIDITY_{.t}$ = the mean value of $LIQUIDITY_{it}$ across all companies in year *t*;
$LEVERAGE_{it}$ = total liabilities divided by total assets; and
$LEVERAGE_{.t}$ = the mean value of $LEVERAGE_{it}$ across all companies in year *t*.

Panel C reports the mean values of each variable during the final year of the mandatory regime. The companies that chose to be audited when audits became voluntary received significantly higher credit ratings during the mandatory regime. The mean rating assigned to these companies was 67.48, as compared to 58.50 for the companies that later opted out; this nine-point difference is highly significant ($p < 0.01$). Panel D reports the mean values of each variable during the first year of the voluntary audit regime. Interestingly, we find that the spread in credit ratings between the companies that choose to be audited and those that opt out is larger in 2004, when auditing was no longer mandatory. The mean rating for the voluntarily audited companies is 73.38, as compared to 58.25 for the companies that chose not to have their financial statements audited. The difference in the ratings assigned to these two types of companies is more than 15 points during the voluntary regime (73.38 minus 58.25), compared with only nine points in the previous year (67.48 minus 58.50). This corroborates our earlier evidence and the predictions in H1 and H2 on the impact of the regime switch on the spread in credit ratings between the two types of companies.

Regression Results

Table 5 presents the estimation results for Equation (1′). Our first hypothesis is tested using the μ_3 coefficient, which captures the effect of the regime switch on the credit ratings of companies that continue with the audit ($OPTOUT_i = 0$). This coefficient is positive (1.89) and highly significant ($p < 0.01$) in Model 1. Economically, this implies that credit ratings increased by nearly two points between 2003 and 2004 for the companies that continued to be audited in the voluntary regime. This is consistent with our prediction that the decision to retain an auditor voluntarily conveys a favorable message about the company's credit risk. For these companies, there was apparently no significant change in audit assurance because the companies were audited in both years and their auditor choice and audit fees remained constant. Moreover, these companies did not experience any significant changes in their financial characteristics that might otherwise explain the change in their credit ratings (Table 4). Consistent with H1, the increase in credit ratings suggests that companies transmit a positive signal about their credit risk by voluntarily remaining audited. This is important because it supports the argument that voluntary auditing permits a signaling role that is absent when audits are required by law.

The coefficient on the $OPTOUT_i$ variable gauges the credit rating difference during the final year of the mandatory audit regime ($SWITCH_t = 0$) between companies that subsequently remain audited or opt out. The coefficient on this variable is negative and highly significant ($\mu_1 = -7.47$; $p < 0.01$) in Model 1. This reinforces the evidence from the univariate tests that opt-out companies were already recognized by the ratings agency as being relatively high-risk companies even before auditing became voluntary. In particular, these companies had credit ratings in 2003 that were nearly eight points lower than the companies that subsequently kept the audit.

The $OPTOUT_i \times SWITCH_t$ coefficient captures the impact of the regime switch on the spread in credit ratings between the two types of company. The coefficient is −5.72 and highly significant ($p < 0.01$). Therefore, the regime switch is associated with a relative decline of nearly six credit points for opt-out companies relative to the companies that keep the audit. This suggests that the regime switch provided new information to the ratings agency, leading to a larger spread in credit ratings between the two types of companies.

We test H2 by adding the coefficients on $SWITCH_t$ and $OPTOUT_i \times SWITCH_t$. The summation, $\mu_2 + \mu_3$, captures the effect of the regime switch on the credit ratings of companies that opt out of the audit ($OPTOUT_i = 1$). The results indicate that the credit ratings of these companies fall by nearly four points ($-5.72 + 1.83 = -3.83$ in Model 1). This is consistent with the H2 prediction that the ratings agency downgraded these companies both due to the loss of audit assurance and the negative signal stemming from their decision to abandon the audit.

TABLE 5

The Effect of the Switch from Mandatory to Voluntary Audits on Credit Ratings (2003–2004)

$$\begin{aligned} RATING_{it} - RATING_{i.} = {} & \mu_0 + \mu_1 OPTOUT_i + \mu_2 OPTOUT_i \times SWITCH_t + \mu_3 SWITCH_t \\ & + \mu_4(AGE_{it} - AGE_{i.}) + \mu_5(LTS_{it} - LTS_{i.}) + \mu_6(LTA_{it} - LTA_{i.}) \\ & + \mu_7(INTCOV_{it} - INTCOV_{i.}) + \mu_8(LIQUIDITY_{it} - LIQUIDITY_{i.}) \\ & + \mu_9(LEVERAGE_{it} - LEVERAGE_{i.}) + w_{it} \qquad (1') \end{aligned}$$

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**
$OPTOUT_i$	−7.47	−13.15***	−8.98	−14.02***	−7.51	−13.23***	−8.98	−14.02***
$OPTOUT_i \times SWITCH_t$	**−5.72**	**−10.32*** **	**−6.15**	**−10.42*** **	**−5.77**	**−10.32*** **	**−6.15**	**−10.42*** **
$SWITCH_t$	**1.89**	**5.83*** **	**2.03**	**5.94*** **	**1.94**	**5.84*** **	**2.03**	**5.94*** **
$AGE_{it} - AGE_{i.}$	0.27	20.10***			0.27	19.96***		
$INTCOV_{it} - INTCOV_{i.}$	−9.19	−34.36***			−9.24	−34.23***		
$LTS_{it} - LTS_{i.}$	1.12	4.74***			1.04	4.41***		
$LTA_{it} - LTA_{i.}$	3.06	9.87***			2.96	9.50***		
$LIQUIDITY_{it} - LIQUIDITY_{i.}$	0.81	7.14***			0.82	7.20***		
$LEVERAGE_{it} - LEVERAGE_{i.}$	−5.00	−11.12***			−5.06	−11.19***		
$\mu_3 = 0$	F = 34.04***		F = 35.26***		F = 34.04***		F = 35.26***	
$\mu_2 + \mu_3 = 0$	F = 72.52***		F = 73.35***		F = 72.52***		F = 73.35***	
R^2	30.2%		7.8%		30.2%		7.8%	
Observations	10,278		10,278		10,278		10,278	

*, **, *** Statistically significant at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed).
Industry dummy variables are included (see Table 1), but the coefficients and the intercept are not tabulated.
Under H1, $\mu_3 > 0$. Under H2, $\mu_2 + \mu_3 < 0$. Models 1 and 2 are estimated on the full sample of 10,278 observations. Models 3 and 4 are estimated after dropping the 176 companies that change auditor between 2003 and 2004. The t-statistics are reported with standard errors that are adjusted for heteroscedasticity and clustering on each company.
Bold indicates effect of the switch from mandatory to voluntary audits on credit ratings (2003–2004).
The $LIQUIDITY_{it}$ and $LEVERAGE_{it}$ variables are winsorized because otherwise they would suffer from outliers. The other variables do not need to be winsorized, as they do not suffer from outliers.

Variable Definitions:
$RATING_{it}$ = the credit rating score (from 1 to 100, where a higher score implies a better rating) for company i in year t;
$OPTOUT_i$ = 1 if company i chooses to opt out of the audit, and 0 if company i continues to be audited;
$SWITCH_t$ = 1 if audits are voluntary (2004), and 0 if audits are mandatory (2003);
AGE_{it} = the age of company i in year t;
$INTCOV_{it}$ = interest expense divided by earnings before interest and taxation (the $INTCOV_{it}$ ratio is capped at 2.00, and we assign a value of 2.00 if earnings before interest and taxation is negative);
LTS_{it} = log of total sales (£000);
LTA_{it} = log of total assets (£000);
$LIQUIDITY_{it}$ = quick ratio ((current assets − inventory)/current liabilities); and
$LEVERAGE_{it}$ = total liabilities divided by total assets.

Model 2 in Table 5 presents estimation results after dropping the control variables from the regression. The coefficient estimates are very similar to those reported in Model 1. The $OPTOUT_i$ coefficient is −8.98 (compared with −7.47 in Model 1), the $OPTOUT_i \times SWITCH_t$ coefficient is −6.15 (compared with −5.72), while the $SWITCH_t$ coefficient is 2.03 (compared with 1.89). The results for our two hypotheses remain highly significant. Our finding that the results are very similar, regardless of whether we include control variables in the credit ratings model, is comforting, as it suggests that the results are unlikely to be affected by extraneous independent variables. In other words, when observable measures of financial condition are omitted from the credit ratings model, the results on our treatment variables are virtually identical. It follows that the treatment variables are largely orthogonal to observable proxies for financial distress, mitigating concerns about an omitted variable problem.

Models 3 and 4 present the results for the same specifications after excluding the 176 cases in which companies change auditors between 2003 and 2004. We drop these observations to minimize the possibility that there is a change in audit assurance in this situation. The results are very similar, supporting our conclusion that the change in credit ratings is driven by the signal stemming from the decision to be audited rather than from the company's choice of auditor.[16]

The results for the control variables are generally consistent with prior research that examines the determinants of private company credit ratings (e.g., Fortin and Pittman 2007). In particular, companies have better credit ratings when they are older (AGE_{it}) and larger (LTS_{it}, LTA_{it}). In addition, companies attract worse ratings when they have lower interest coverage ($INTCOV_{it}$), higher leverage ($LEVERAGE_{it}$), and lower liquidity ($LIQUIDITY_{it}$).[17]

Figure 1 summarizes our evidence regarding the impact of the regime switch on credit ratings for the two types of companies. During the mandatory regime, the companies that later chose to be audited received credit ratings that were approximately eight percentage points higher than those that did not. After auditing becomes voluntary, the companies that remain audited receive a further two-point boost to their ratings, while the unaudited companies suffer a four-point penalty. Consequently, the spread in credit ratings widens after the switch away from mandatory audits because the ratings agency is better able to distinguish between the two types of companies. During the voluntary regime, the audited companies receive credit ratings that are 14 points higher than the unaudited companies. This is comprised of the initial spread during the mandatory regime of eight points plus an additional six points when auditing becomes voluntary.

To provide some perspective on the magnitude of these results, we assess whether the upgrade of two points (for companies that keep the audit) and the downgrade of four points (for companies that abandon the audit) are economically material. The credit rating agency uses its scores to assign companies into five categories: (1) "High risk" ($0 \leq$ credit rating ≤ 20); (2) "Caution" ($21 \leq$ credit rating ≤ 40); (3) "Normal" ($41 \leq$ credit rating ≤ 60); (4) "Stable" ($61 \leq$ credit rating ≤ 80); and (5) "Secure" ($81 \leq$ credit rating ≤ 100). Of the 5,139 companies in our sample, we find that 704 (13.7 percent) move up to a higher-rated category by attracting two additional credit points as a result of being voluntarily audited. In the other direction, 989 companies (19.2 percent) move down to a lower category as a result of losing four points due to their decision to opt out of the audit. Accordingly, the decision on whether to undergo an audit changes the credit risk category for nearly one-third of our sample companies (32.9 percent) once auditing becomes voluntary, reflecting its economic importance.

This naturally begs another question: why do companies choose to opt out of the audit, given that there is a large negative impact on their credit ratings? The most likely answer is that the cost of

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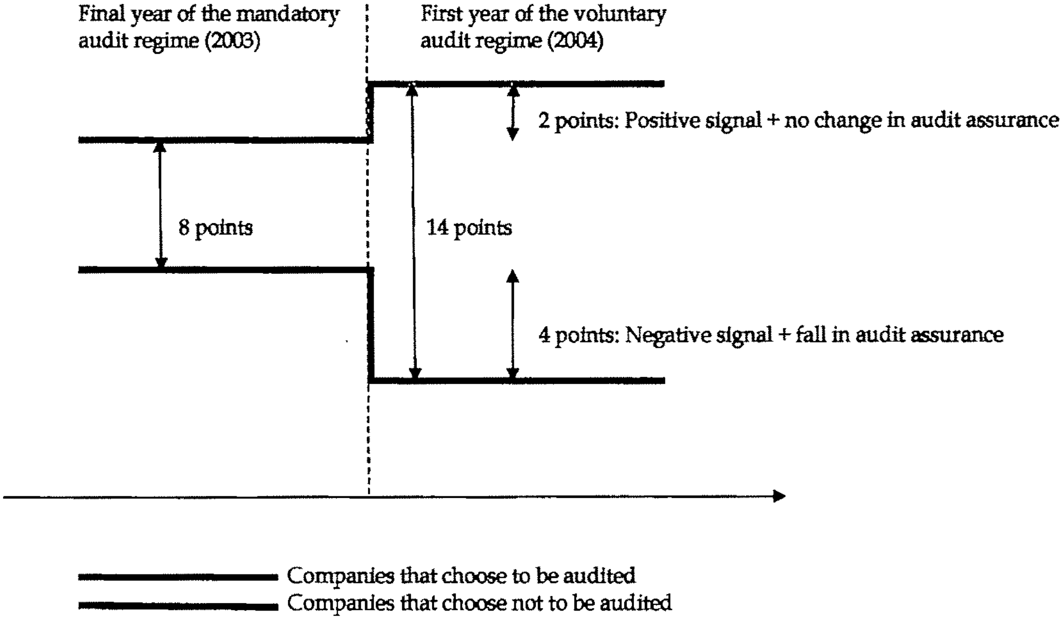
[16] Of the 176 auditor changes between 2003 and 2004, seven involve an upgrade from a non-Big 4 auditor to a Big 4 auditor, while 25 are in the opposite direction, from a Big 4 auditor to a non-Big 4 auditor. We find that the regime switch has no significant impact on the likelihood of an auditor upgrade versus the likelihood of a downgrade.

[17] In untabulated tests, we rerun the models in Table 5 after partitioning the sample between high-leverage and low-leverage firms. In the subsample of high-leverage firms, we find strong support for our first hypothesis that credit ratings increase when firms remain audited (i.e., $\mu_3 > 0$). Consistent with H2, we also find that credit ratings fall for high-leverage firms that opt out of the audit, although this result is not statistically significant. In the subsample of low-leverage firms, we find no significant change in credit ratings for firms that continue undergoing an audit (i.e., $\mu_3 = 0$). However, the results strongly support H2, since credit ratings fall significantly for low-leverage firms that opt out of the audit (i.e., $\mu_2 + \mu_3 < 0$).

FIGURE 1

Credit Ratings during the Mandatory and Voluntary Audit Regimes for Companies that are Voluntarily Audited and Companies that are Not Audited


Final year of the mandatory audit regime (2003)
First year of the voluntary audit regime (2004)
2 points: Positive signal + no change in audit assurance
8 points
14 points
4 points: Negative signal + fall in audit assurance
Companies that choose to be audited
Companies that choose not to be audited

a lower credit rating is insufficient to compensate for the cost of the audit. The mean audit fee in 2003 is just £4,270 for the companies that opt out of having an audit in the following year (Table 4, Panel C). Presumably, these companies perceive that the economic benefits of continuing with the audit are no greater than £4,270 (on average), which explains their decision to stop being audited. The mean audit fee is £5,680 for the companies that continue with the audit (Table 4, Panel C). Apparently, these companies perceive that the economic benefits of continuing to be audited are greater than £5,680 (on average), which is why these companies keep the audit.

Under the assumption that a lower cost of borrowing is the primary benefit stemming from the audit, we can use audit fees to calculate upper and lower bounds for the likely change in the cost of debt. For the companies that chose not to be audited, the mean value of short-term and long-term debt is £231,000.[18] It follows that the borrowing cost savings that these companies would have enjoyed if they had been audited must be no greater than 1.8 percent (i.e., £4,270/£231,000). For the companies that chose to remain audited, the mean value of (short-term and long-term) debt is £301,000. Accordingly, the cost of debt reduction that these companies enjoy as a result of being audited would be at least 1.9 percent (i.e., £5,680/£301,000). However, we caution that these ballpark figures (1.8 percent and 1.9 percent) likely exaggerate the debt pricing benefit to the extent that audits provide economic benefits other than cheaper borrowing costs (e.g., a company may value the business advice provided by its auditor).[19]

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[18] We exclude non-interest-bearing trade payables when specifying short-term debt.

[19] Blackwell et al. (1998) measure borrowing costs using proprietary data from banks, and they find that lenders charge lower interest rates to private companies whose financial statements are voluntarily audited rather than unaudited. Regrettably, we do not have access to such proprietary data and we find that alternative measures of the interest rate estimated from financial statement information are unreliable.

Auditor Choice and Audit Fees during the Final Year of the Mandatory Audit Regime

Our primary findings are that the credit ratings agency upgraded the companies that remain audited and downgraded the companies that opted out once auditing became voluntary. However, we also find that credit ratings were significantly lower during the final year of the mandatory regime for the companies that later opt out (i.e., there is a significant negative coefficient on $OPTOUT_i$ in Table 5). Thus, even when auditing was compulsory, the companies that were audited involuntarily were perceived by the credit ratings agency as being relatively high-risk types of borrowers.

This evidence motivates analyzing whether the company's intention to keep the audit or opt out could have been (imperfectly) discerned prior to the regime switch. We expect that the opt-out companies would write contracts that minimize the costs of auditing when auditing is legally required. Thus, we examine whether the opt-out companies were privately contracting for low audit assurance during the mandatory regime. Such companies are likely to be "going through the motions" in terms of passively complying with the audit requirement, thereby reducing the societal benefit of forcing companies to be audited.

We expect the companies that would choose not to be audited under a voluntary regime will resist choosing high-quality auditors when they are compelled to be audited. In contrast, the companies that would choose to be audited under a voluntary regime are more likely to choose high-quality audit firms when auditing is compulsory. In this case, imposing audits prevents companies from signaling their types through their decision on whether to appoint an auditor, but they can still partly reveal their types through their decision on whether to choose a high-quality or low-quality auditor (Titman and Trueman 1986).

Studies from the U.K. and elsewhere suggest that the Big 4 firms supply higher-quality audits than do smaller auditors (e.g., Lennox 1999; Peel and Roberts 2003; Francis 2004; McMeeking et al. 2006), although the evidence is more mixed for private companies (Vander Bauwhede and Willekens 2004; Fortin and Pittman 2007; Clatworthy and Peel 2007).[20] Under the assumption that the Big 4 firms supply higher-quality audits, we expect that the opt-out companies would privately contract for a lower level of assurance by appointing non-Big 4 firms when audits are mandatory.[21]

Similar arguments apply to a company's incentives to pay for a high-quality audit. A company that would not be audited under a voluntary regime would be likely to privately contract for a lower audit fee when audits are compulsory. In contrast, a company that would choose to be audited voluntarily is more likely to accept the higher fee that ensues when an auditor supplies more effort and provides greater audit assurance on the financial statements. We, therefore, expect that the opt-out companies were paying relatively low audit fees during the mandatory regime.

We test these arguments by estimating auditor choice and audit fee models using data from the final year of the mandatory audit regime (2003):

$$BIG4_{it} = \beta_0 + \beta_1 OPTOUT_i + \beta_2 X_{it} + v_{it.}, \tag{2}$$

$$LAF_{it} = \alpha_0 + \alpha_1 OPTOUT_i + \alpha_2 X_{it} + u_{it}, \tag{3}$$

where:

$BIG4_{it}$ = 1 if company i chooses a Big 4 audit firm, and 0 otherwise;
LAF_{it} = the log of company i's audit fees in 2003; and
X_{it} = a vector of time-varying control variables for company i.

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[20] Prior research finds that Big 4 auditors charge higher fees, but the pair-wise correlation between auditor choice and audit fees is only 0.14 in our sample, suggesting that these variables reflect different underlying constructs.

[21] Lawrence et al. (2011) provide evidence on U.S. public firms that casts doubt on whether Big 4 auditors genuinely provide better external monitoring of the financial reporting process.

The coefficients on the $OPTOUT_i$ variable will be significantly negative in Equations (2) and (3) if the companies that later opt out when audits first become voluntary choose non-Big 4 auditors and pay lower audit fees when audits are mandatory.

The results for the auditor choice model are shown in Column (1) of Table 6. The $OPTOUT_i$ coefficient is negative and highly significant ($p < 0.01$). Thus, the companies that would later opt out of the audit are less likely to appoint Big 4 audit firms than are companies that later kept the audit. The results for the audit fee model are shown in Column (2) and, again, the $OPTOUT_i$ coefficient is negative and highly significant ($p < 0.01$). Therefore, the companies that would opt out under a voluntary system were paying significantly lower audit fees during the final year of the mandatory regime. In contrast, the companies that kept the audit had a higher demand for assurance services evident in the higher fees that these companies paid to their auditors. Overall, these findings suggest that companies' demand for audit assurance was *partially* signaled through their auditor choice and compensation during the mandatory regime. Nevertheless, the findings in Table 5 indicate that voluntary auditing permits companies to convey an incrementally informative signal through their choice of whether to be audited.

TABLE 6

Auditor Choice and Audit Fees during the Final Year of the Mandatory Audit Regime (2003)

	Auditor Choice Model **Dep. Var. =** $BIG4_{it}$		**Audit Fees Model** **Dep. Var. =** LAF_{it}	
	Model 1		**Model 2**	
	Coeff.	**z-stat.**	**Coeff.**	**t-stat.**
$OPTOUT_i$	−1.10	−5.94***	−0.13	−7.20***
AGE_{it}	−0.00	−1.00	0.01	5.64***
$INTCOV_{it}$	0.29	3.87***	0.13	11.55***
LTS_{it}	0.15	2.35**	0.25	21.83***
LTA_{it}	0.77	7.62***	0.19	14.84***
$LIQUIDITY_{it}$	0.07	2.82***	0.01	1.74*
$LEVERAGE_{it}$	0.52	5.59***	0.03	1.45
$BIG4_{it}$			0.20	5.35***
Industry dummy variables?	Yes		Yes	
R^2/pseudo R^2	10.5%		23.5%	
Observations	5,139		5,139	

*, **, *** Statistically significant at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed).
The t-statistics and z-statistics are reported with standard errors that are adjusted for heteroscedasticity.
Industry dummy variables are included (see Table 1), but the coefficients and the intercept are not tabulated.
The $LIQUIDITY_{it}$ and $LEVERAGE_{it}$ variables are winsorized because otherwise they would suffer from outliers. The other variables do not need to be winsorized, as they do not suffer from outliers.

Variable Definitions:
$BIG4_{it}$ = 1 if the company is audited by a Big 4 audit firm, 0 otherwise;
LAF_{it} = log of audit fees (£000);
$OPTOUT_i$ = 1 if company *i* chooses to opt out of the audit, and 0 if company *i* continues to be audited;
AGE_{it} = the age of company *i* in year *t*;
$INTCOV_{it}$ = interest expense divided by earnings before interest and taxation (the $INTCOV_{it}$ ratio is capped at 2.00, and we assign a value of 2.00 if earnings before interest and taxation is negative);
LTS_{it} = log of total sales (£000);
LTA_{it} = log of total assets (£000);
$LIQUIDITY_{it}$ = quick ratio ((current assets − inventory)/current liabilities); and
$LEVERAGE_{it}$ = total liabilities divided by total assets.

The results for the control variables are consistent with prior studies on the determinants of auditor choice and audit fees. The auditor choice model shows that Big 4 clients tend to be larger, while they also have higher liquidity and greater interest coverage. Larger and older companies pay significantly higher audit fees, while the interest coverage variable has a significantly positive coefficient in the audit fee model, implying that fees are higher when a company's earnings are low relative to its interest expense. This could reflect that audit fees are higher when companies are in financial distress to compensate for the increased audit risk.[22]

Additional Analysis of Big 4 and Non-Big 4 Audits

In 2003, 4,835 sample companies were audited by non-Big 4 firms, compared with only 304 companies that were audited by the Big 4. These descriptive statistics reflect that all of the companies in our sample are very small, translating into relatively few companies needing to approach the Big 4 firms to undertake their audits. In 2004, the number of Big 4 audits falls by 18.4 percent, from 304 to 248, while the number of non-Big 4 audits drops 34.0 percent, from 4,835 to 3,192. Accordingly, the regime switch had a bigger impact on the number of audits conducted by the non-Big 4 firms than those by the Big 4.

Because Big 4 audits are relatively scarce in our sample, we re-estimate the models for credit ratings and audit fees after excluding the companies that were audited by Big 4 firms in 2003. The ratings models reveal that the non-Big 4 clients enjoy a statistically significant two-point increase in their credit ratings when they continued being audited in 2004 (H1), while the non-Big 4 clients that stopped being audited suffered a significant four-point drop (H2). Thus, the credit ratings spread between the two types of companies increased from nearly 8 to 14 points between 2003 and 2004. In another estimation, the audit fee model continues to show that the involuntarily audited companies paid significantly lower audit fees during the mandatory regime than did the companies that later chose to remain audited.

We also re-estimate the credit ratings and audit fee models for the subsample of 304 companies that were audited by Big 4 firms in 2003. We find that credit ratings increased for the 268 Big 4 clients that chose to remain audited in 2004 ($p < 0.01$), while there was an insignificant drop in credit ratings for the 36 Big 4 clients that were no longer audited ($p = 0.63$).[23] The companies that chose to be audited received credit ratings that were nearly seven points higher during the mandatory regime ($p = 0.11$) and 14 points higher during the voluntary regime ($p < 0.01$). However, the $OPTOUT_i$ coefficient is not statistically different from zero in the audit fee model. This insignificant result is perhaps unsurprising, given that the companies that chose Big 4 audits in 2003 had already revealed their preference for higher-quality audits and so were not intent on minimizing audit costs.

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[22] The R^2 in the audit fee model is only 24 percent, which is lower than in prior studies because the companies in our sample are nearly homogeneous in terms of their size. Most of the R^2 in prior audit fee studies comes from the cross-sectional variation in company size, which is low in our study because every company must meet the size thresholds for mandatory audits in 2003 and voluntary audits in 2004. In analyzing a wide range of private and public clients of a large international accounting firm, Bell et al. (1994) document that the explanatory power of audit fee regressions steeply subsides as clients become smaller.

[23] For the 36 Big 4 clients that are no longer audited, credit ratings fall by a statistically insignificant 1.65 points. However, this test suffers from low power stemming from the small sample size, which is corroborated by a comparison of the impact of electing to abandon the audit on credit ratings for non-Big 4 and Big 4 clients. Reassuringly, we find that the drop in credit ratings is not significantly different between the 1,663 non-Big 4 clients and the 36 Big 4 clients that cease to be audited, whereas the drop in credit ratings for the 1,663 non-Big 4 clients is statistically significant ($p < 0.01$). It follows that low power is responsible for the lack of statistical significance when we isolate the sample of 36 Big 4 clients. Finally, the fact that only 36 Big 4 clients opt out of the audit is consistent with our evidence in Table 6 (Model 1) that non-Big 4 clients are much more likely to abandon the audit when this becomes permissible.

V. CONCLUSIONS

The absence of evidence on the implications of forced versus voluntary auditing motivates our research on economic outcomes surrounding legislation that rescinds mandatory audits. Taking advantage of a regulatory regime change from mandatory to voluntary audits for privately held U.K. companies, we isolate whether there is a signaling benefit from allowing audits to be voluntary, as theory predicts that the company's decision on whether to be audited conveys valuable information to outsiders about its type (Melumad and Thoman 1990). We also test whether the companies that would choose to avoid an audit under the voluntary regime were privately contracting for a relatively low level of audit assurance during the mandatory regime. Given recent research that auditors play a major role as information intermediaries in debt contracting, credit ratings suit our analysis of the signaling impact of the change in audit regime.

Our analysis provides strong, robust evidence that the move away from mandatory auditing engenders an important role for signaling, in which the low-risk companies convey their favorable borrowing characteristics by continuing with an audit. The companies that remain audited enjoy significantly higher credit ratings after the regime change, even though these companies were audited in both 2003 and 2004 and the assurance value of their audits was apparently stable. We attribute this upgrade in credit ratings to the positive impression that voluntarily submitting to an audit conveys to outsiders. Importantly, the decision to be audited voluntarily conveys information that is incremental to the signals that exist in a mandatory regime, where alternative mechanisms—namely, appointing Big 4 auditors and paying higher audit fees—only partly reveal companies' types. In short, our results imply that imposing audits removes an important mechanism by which companies are able to communicate their types.

We also find that the opt-out companies were significantly less likely to appoint Big 4 audit firms, and they paid significantly lower fees during the mandatory regime relative to the companies that remain audited after auditing became optional. This evidence suggests that the compulsorily audited companies were passively complying with the audit requirement and were subject to less strict monitoring than the companies that that would have voluntarily chosen to be audited. The main policy rationale for mandatory auditing is that external stakeholders obtain significant assurance benefits when companies that would not voluntarily choose an audit are forced into it. Our results suggest that these benefits are likely to be modest for privately held companies, as the companies that do not want to be audited privately contract for low levels of audit assurance when audits are legally required.

Finally, for several reasons, we stress that our research cannot provide a definitive answer to policy-makers on whether audits should be voluntary or mandatory. First, companies focus on their own private costs and benefits when considering whether to purchase an audit, and we are not able to measure the spillovers that accrue to external users from having the financial statements audited for every company. Second, our empirical analysis is restricted to private companies, preventing us from commenting on the extent to which our conclusions would generalize to public companies. Third, although extensive prior research analyzes the links between auditing and debt pricing, data constraints prevent us from reliably estimating companies' interest rates, so we cannot test how the change in credit ratings affects their borrowing costs.

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How Standardized Is Accounting?

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ABSTRACT: There is disagreement in the accounting community about what level of standardization would be efficient for accounting. Many of the known costs and benefits of standardization have gone unmeasured and, as a result, there have been no efforts to quantitatively identify an efficient level of accounting standardization. Without guidance from researchers, the level of accounting standardization is set according to the intuition of standard-setters. Using data on a large cross-section of occupations, I provide evidence that the level of standardization in financial reporting occupations is far higher than would be expected given their characteristics. I then show with time-series data that the breadth of professional accounting discourse declined during the late 20th century, coincident with increases in the output of standard-setters. A lower quality discourse is one of many possible consequences of inefficient standardization.

Keywords: *accounting standards; standards overload; accounting occupations; O*NET; Financial Accounting Standards Board (FASB); Public Company Accounting Oversight Board (PCAOB).*

Data Availability: *Occupations data in the O*NET, Career One Stop, and Occupational Employment Statistics (OES) databases are available from the U.S. Department of Labor. Data from the General Social Survey (GSS) are available from the National Opinion Research Center (NORC) at The University of Chicago. Contact the author for the data collected from the Accountants' Handbook.*

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I. INTRODUCTION

The objective of this study is to provide evidence on the level of accounting standardization in the U.S. based on an empirical model of the level of standardization present in a wide variety of occupations.[1] Using theory from economics, sociology, and accounting, I model the level of standardization in a sample of occupations as a function of the characteristics of the occupations' work. I estimate the model using primarily data from the U.S. Department of Labor's (DOL) O*NET database. O*NET is a collection of survey data gathered from U.S. workers in more than 800 occupations, and details the background, skills, and tasks that are necessary for performing their jobs. My measure of standardization comes from O*NET questions about the extent to which a job requires workers to evaluate information to determine if it complies with standards, and the complexity of those standards.[2] Occupational features that are empirically associated with standardization are job difficulty, the importance of innovation in the job, legal risks, and the extent of professionalization. The model explains almost half of the cross-sectional variation in the level of standardization in my sample.

Using this empirical model of occupational standardization, I show that the accounting occupations most involved with financial reporting (especially auditors) are more standardized than the model predicts. In contrast, bookkeeping, the accounting occupation with the least interaction with standard-setters, is less standardized than predicted. This suggests that high levels of standardization are evident primarily within the reporting function of accounting but not the more mechanical recording function of bookkeeping.

Disagreement about the optimal level of accounting standardization is evident in the literature on "standards overload," which argues that financial reporting is excessively standardized (McGill and Arnstein 1972; Hepp and McRae 1982; Seidler 1990; AICPA 2005).[3] In reply, standard-setters argue that they write detailed standards, with complexity-increasing features like implementation guidance and applicability exceptions, because their constituents demand them (Beresford and Van Riper 1992; FASB 2002). Standard-setters perform cost/benefit analyses for each new standard, but these analyses are inevitably inconclusive because of the difficulty of identifying and measuring the costs and benefits of accounting standards (Watts and Zimmerman 1986; FASB 1991; Dye and Sunder 2001; Fields et al. 2001). As a result, there is consensus among accounting and legal scholars that the optimal level of standardization in accounting is unknown (Easterbrook and Fischel 1991, 276–314; Fields et al. 2001; Meeks and Swann 2009).

The advantage of my approach relative to cost/benefit analysis is that it relies on observing the level of standardization that has evolved in hundreds of occupations as they compete for business.

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[1] There is no well-accepted definition for the term "standard." For the purposes of this study, I define standards as "formalized and codified decision rules that join professional knowledge to action" (Baer 1986). This is a broad definition that encompasses decision-making tools like laws, rules, or routines.

[2] Detailed distinctions between types of standards, like quality versus coordination standards or rules- versus principles-based standards, are not empirically examined in this study. Rather, this study groups all types of standards together. This is apparent in my theory-level definition of standards and in the proxy I use for occupational standardization, which are both broad. There is clearly variation in the extent to which differing standards constrain choices. For example, a principles-based standard like "first do no harm" is less constraining (and likely less salient) than a building code for a fireplace, which are often checklists of specific rules (I thank an anonymous reviewer for suggesting this distinction). While I expect that my measure of standardization is higher for principles-based than rules-based standards, I cannot test this conjecture. Empirical examination of specific types of standards in occupational contexts may be an interesting avenue for future research. For more on standard-setting organizations and quality versus coordination standards, see Jamal and Sunder (2007). For more on rules- versus principles-based standards, see for example Nelson (2003), Schipper (2003), and SEC (2003).

[3] Written standards are a substitute for professional judgment guided by social norms (Sunder 2005). The claim that the standardization of accounting occupations is inefficiently high necessarily implies that the reliance of accountants on professional norms is inefficiently low.

This competitive process likely disciplines occupations and rewards those that use standards to improve their competitive position. The observed level of standardization can then be modeled as a function of the observable characteristics of the occupation that theory predicts will make standards attractive to workers. The primary implication of my findings is that accounting standardization has evolved to a level greater than predicted, based on factors associated with the level of standardization evident in a broad sample of occupations.

Inefficient standardization is likely associated with substantial costs.[4] For example, while too little standardization could cause investors to lose the network externality generated when financial statements are comparable (Farrell and Saloner 1985), excessive standardization could render beneficial accounting innovations less likely (Sunder 1988).

The second part of this study examines empirically one alleged cost of excessive standardization, that it stifles the discourse among accounting professionals (Baxter 1962). Baxter predicts that authoritative standard-setting will crowd out other participants from the professional dialogue in accounting. An increasingly narrow and standards-centric professional dialogue is likely to have significant undesirable consequences, such as reduced value-increasing innovation and poorer quality education (Baxter 1962; Benner and Tushman 2002; West 2003; Cole and Matsumiya 2007; Sunder 2010).

My examination of the effect of standardization on accounting discourse uses citations from eight editions of a long-lived and widely circulated accounting reference manual, the *Accountants' Handbook*, to quantify the properties of the professional discourse on various accounting topics between 1923 and 2007. I find that the influence of standard-setters increased slowly during the tenures of the Committee on Accounting Procedure (CAP) and the Accounting Principles Board (APB), then accelerated following the establishment of the Financial Accounting Standards Board (FASB) in the 1970s. This increase in standard-setter influence coincided with a reduction in the participation of a number of other groups in the dialogue about accounting, consistent with Baxter's (1962) prediction.

My results must be interpreted with caution because they depend on the descriptive validity of the model of occupational standardization that I develop, the quality of the O*NET data I use to estimate the model, and the quality of the data on accounting discourse. They are also specific to the U.S. context and care must be taken when generalizing them to other contexts. As with all empirical models, my model may omit important variables. While I search broadly to identify variables that likely explain standardization, it is possible that future research will discover important relations not captured in the model. Also, the O*NET data come from worker surveys and, as such, they reflect the opinions of workers about their own jobs, which likely have some biases. The evidence I present of predictable associations among variables, the high explanatory power of the model, and the robustness of the results to alternative specifications, including a specification using O*NET 4.0—which does not rely on worker responses to survey questions[5]—suggests that the biases do not render the data uninformative.

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[4] The concept of efficiency as I use it here signifies what Douglas North calls "adaptive efficiency" (North 1990). See Section II for more discussion of adaptive efficiency.

[5] O*NET 4.0 was released in 2001 and was the last version of O*NET that was prepared using data from "occupational analysts" rather than workers in occupations. The disadvantage of the "occupational analyst" data is that the knowledge of the analysts about a given job may not be as deep and complete as the knowledge of a person working on the job. The advantage of the analyst data is that the analysts *did not self-select into the jobs the data describe*. The minimum requirements to serve as an occupational analyst were two years of work experience, two years of graduate education in I/O or vocational psychology, human resources, or industrial relations, specific courses on job analysis, and O*NET training. Finding that the results obtained from O*NET 12.0 also exist in O*NET 4.0 would suggest that the O*NET 12.0 results were not due to differences in perception of workers who have self-selected into a given occupation. For a more detailed description of the analyst qualifications and training, see http://www.onetcenter.org/reports/AnalystProc.html. The robustness test using the O*NET 4.0 data is discussed with other robustness tests at the end of Section III.

In Section II, I develop the study's core hypothesis. Section III presents a model of the level of standardization in occupations. Section IV presents an analysis of the professional discourse in accounting. Section V concludes.

II. HYPOTHESIS DEVELOPMENT

For standard-setters, balancing the costs and benefits of standardization is difficult because little is known about what would constitute an efficient level of standardization in accounting. The problem faced by standard-setters is not like a classic optimization problem because they must deal with market frictions, externalities, and imperfect information. The term "efficiency" as I use it here refers to what Douglas North calls "adaptive efficiency" (North 1990, 80–82). Adaptive efficiency differs from standard neoclassical allocative efficiency, which occurs when goods are allocated to exploit all potential Pareto improvements, assuming no market frictions or externalities and perfect information. In contrast, adaptive efficiency assumes the presence of market frictions, externalities, and fundamental uncertainty (Knight 1921). In such a world, "'profit maximization' is meaningless as a guide to specifiable action" (Alchian 1950, 211), and adaptation to unpredictably changing circumstances becomes more important than allocation for economic success (Kling 2007). Adaptively efficient solutions are those that evolve over time in response to selection pressures and market feedback to successfully compete in an uncertain environment against other known alternatives. In other words, an adaptively efficient solution is the known solution that best enhances the survival prospects of its users.

The levels of standardization observable in a cross-section of occupations are potentially valuable for estimating a meaningful benchmark level of efficient standardization in accounting occupations. This is due, in large part, to the fact that occupations and the workers in them face competition with other occupations. There are hundreds of occupations in the United States, each performing distinct sets of tasks that overlap on the margins with the tasks performed by other occupations. The domains within which a given occupation operates have been called its "jurisdictions." Occupations compete to expand the number and size of the jurisdictions they control (Abbott 1988).[6] Standards are one tool that occupations can develop to improve their competitive positions.[7] All else equal, occupations that use standards effectively will have greater success than those that do not, and will expand at the expense of occupations that use standards ineffectively.[8] Assuming that competitive forces punish extreme deviations from efficient standardization in an average occupation, comparisons of standardization in accounting occupations to standardization in the population are likely to be informative about the adaptive level of standardization in accounting occupations.

Adaptively efficient solutions are not inevitable. Barriers to achieving adaptive efficiency include institutional structures that reward unproductive work, imperfect knowledge about how a given course of action will turn out, and entrenched organizations that benefit from the existing institutional structure and resist change (North 1990, 99–100; 2005, 116–126). For this reason, my analysis does not assume that all occupations are in equilibrium.

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[6] For example, in the United States in the early 20th century, accountants and engineers fought for control of what is now called "cost accounting." The accountants won (Abbott 1988).

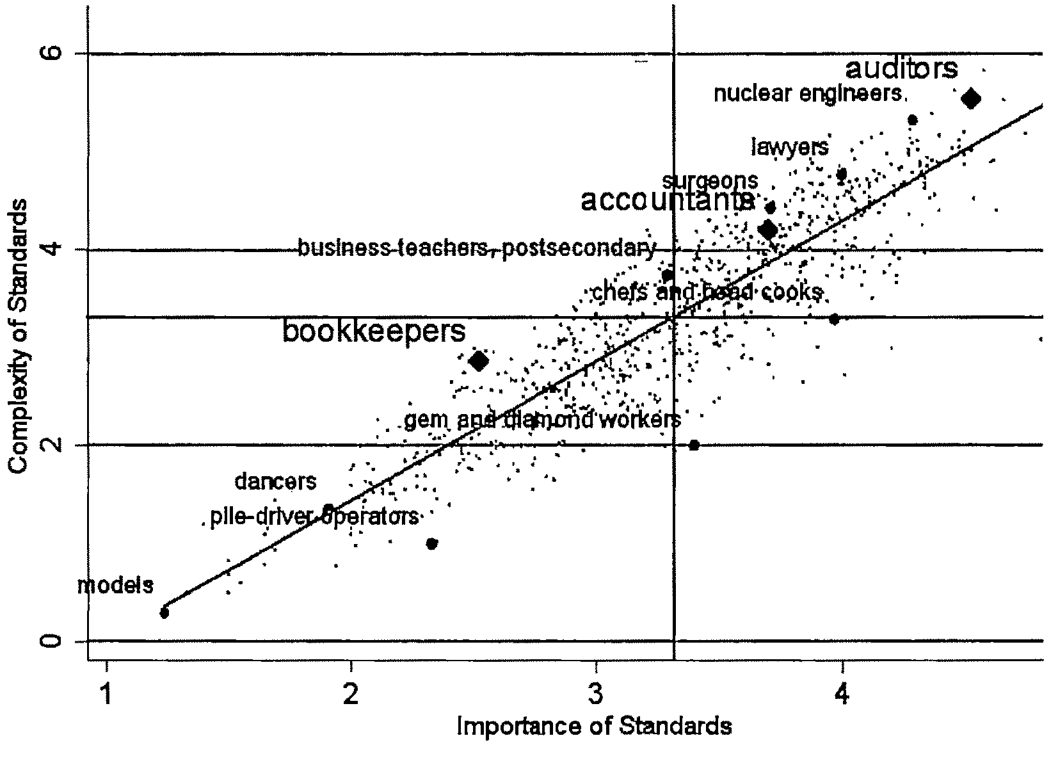
[7] The literature on organizational learning explores the trade-off firms make between exploiting existing knowledge and exploring to discover knowledge (March 1991). There is evidence that the way firms make this trade-off influences their competitive success (Raisch and Birkinshaw 2008). Firms that are "ambidextrous" or that locate themselves near the middle of the continuum between exploitation and exploration strategies enjoy greater sales growth (He and Wong 2004) and Tobin's Q (Uotila et al. 2009).

[8] Examples of occupations that have failed to remain competitive and have disappeared are serjeants-at-law of the English courts and railway surgeons. Examples of occupations that have successfully expanded by taking jurisdictions away from existing occupations are the surgeons and apothecaries that emerged in England to serve the medical needs of the poor (Abbott 1988).

Figure 1 is a scatter plot of occupations arranged according to the importance and complexity of their standards. The data come from the O*NET 12.0 database, which was released in 2007. On the x- and y-axes are measures of the "importance" of standards and the "level" or complexity of standards, respectively, used to perform an occupation's work. The data come from a questionnaire that asks workers how important and how complex (what "level") it is in their current job to "evaluate information to determine if it complies with standards." Appendix A provides variable descriptions. Each point in the figure represents an occupation. The points representing three accounting occupations (bookkeepers, accountants, and auditors) are highlighted and labeled. Several other points, some representing other learned professions, are also labeled to put the accounting points in context.

Figure 1 provides evidence of considerable variation in the importance and complexity of standards within my occupational sample. It is apparent that the standardization of auditors is relatively high, both in terms of the importance and complexity of standards. Accountants are also more standardized than average, while bookkeepers are less standardized than average.

FIGURE 1
Degree of Standardization in Occupations



The data in this figure come from the O*NET database. Each dot represents one occupation. Occupations are arranged according to the importance of standards and the level (complexity) of standards needed to perform the job. A horizontal line marks the mean value for the level of standards and a vertical line marks the mean value for the importance of standards.

While Figure 1 evidences large variation in occupational levels of standardization, it does not allow us to conclude that a given occupation is inefficiently standardized because it does not account for factors that influence occupational standardization. Prior research has identified several forces that could explain the variation evident in Figure 1. Standards can record and disseminate expert knowledge and increase uniformity. By recording expert knowledge, standards potentially reduce litigation risk by providing a justification for decisions (Baer 1986; Healy and Palepu 2001; Healy 2003; Watts 2003), increase the value of professional designations by helping members of the profession perform their job competently (Larson 1977), and help users avoid the costs of becoming an expert or experimenting by trial-and-error (Brunsson and Jacobsson 2000). The increased uniformity arising from standards can also help users of standardized products and services to take advantage of "network externalities" that arise when the value of a product or service increases with the number of users (Katz and Shapiro 1985; Farrell et al. 1992; Dye and Sunder 2001; Healy 2003; Jamal et al. 2003). Uniformity can also increase the value of professional designations by increasing the predictability of professional output (Larson 1977; Meeks and Swann 2009).[9]

Prior research has identified several factors that limit the usefulness of standards. All standards reduce variation, and the standard-setting model in accounting centralizes the decision-making process. Increasing uniformity is one of the major benefits of standardization, but an unavoidable consequence is a loss of variation, from experimentation or favorable accidents, which can be important drivers of innovation (Benner and Tushman 2002; Cole and Matsumiya 2007). Therefore, while uniformity can increase efficiency in the short-term, it can also reduce an occupation's adaptability, which can threaten its long-term relevance (Benner and Tushman 2002). By centralizing the decision-making process, standards can displace expert judgment with the possible consequence of reducing the quality of professional debates and education (Baxter 1962, 1979; Jamal et al. 2005; Sunder 2010). Centralization also creates the risk of regulatory capture (Stigler 1971) and the risk that standards will develop "excess inertia," in which existing standards are difficult to change, forcing outdated standards on users (Farrell and Saloner 1985; Meeks and Swann 2009). Unintended consequences can also be magnified if users react strategically to new standards (Sivakumar and Waymire 2003). Finally, standards involve potentially substantial compliance costs (Meeks and Swann 2009).

To summarize, theory suggests that standardization involves trade-offs. The gains from uniformity are balanced by the costs of rigidity. The relative usefulness of standardization is therefore likely to depend upon the relative magnitudes of those gains and losses for an occupation, given its characteristics. This leads to my null hypothesis:

> **H:** The levels of standardization in accounting occupations are consistent with those in other occupations, after controlling for characteristics expected to influence the level of standardization.

The focus of the empirical work in the next section is on the level of residual standardization currently present in accounting. After dealing with this issue, I evaluate whether temporal increases in accounting standardization have been associated with changes in the nature of accounting's professional debate. Baxter (1962, 421) argues that even a benevolent standard-setter might discourage debate, "whether from fear, or powerful preconceptions, or belief that others can do the job better," and as a result, "ideas are not put to a stern test." I examine this claim in Section IV.

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[9] Standards that are made mandatory and enforced have been proposed as solutions to "market failures." When combined with enforcement, standards have been proposed as solutions to the public goods problem (Gonedes 1976; Beaver 1998; Healy and Palepu 2001; Healy 2003) and as tools to protect the public from negligent harm or purposeful exploitation (Occupational Safety and Health Act 1970; Healy and Palepu 2001; Healy 2003). However, I do not model this function of standards because these market failures are of greatest concern when taking a social welfare perspective, a perspective I do not take here.

III. THE LEVEL OF STANDARDIZATION IN ACCOUNTING OCCUPATIONS

In this section, I describe my data sources, model specification that links included variables to the theory of standards, and results from estimating the empirical model of occupational standards.

Data

Most of the data on occupations in this study come from a database created by the U.S. DOL called O*NET 12.0, which was released in September 2007. I also use data on state licensing requirements from Career One Stop, a website sponsored by the DOL; data on occupations' sizes and average incomes from the DOL's Occupational Employment Statistics (OES); and data on occupation ages from the General Social Survey (GSS).

The O*NET data are collected using surveys that are administered in two stages. The first stage identifies a random sample of businesses that are expected to employ people in the targeted occupation. The second stage selects a random sample of workers in each selected business to complete a survey instrument. Once identified, workers complete one of four questionnaires that aim to describe a dimension of the occupation's characteristics. The questionnaires ask workers to rate how important an item is for performing their current jobs, what level (of complexity) of an item is needed to perform their current jobs, and how frequently their jobs require them to perform certain activities. Appendix A provides summary descriptions of each variable.

The occupations surveyed are classified according to the DOL's Standard Occupational Classification (SOC) system, which was developed to help government agencies produce comparable data on occupations.[10] O*NET 12.0 contains limited data on 801 occupations, 777 of which meet my data requirements. I focus primarily on three accounting occupations within O*NET: bookkeeping, accounting, and auditing clerks (SOC code 43-3031.00), accountants (SOC code 13-2011.01), and auditors (SOC code 13-2011.02).[11] O*NET's descriptions of these occupations explain that: (1) bookkeeping clerks are primarily responsible for the routine recording of accounting data, (2) accountants analyze operations, prepare accounting records and financial statements, prepare budgets, and may manage other accountants, and (3) auditors prepare, analyze, and verify financial statements and collect and analyze data to assess controls and identify fraud or violations of laws, regulations, or management policies.

Model Specification

The dependent variable in the occupation analysis in this section is the extent of standardization in an occupation. The extent of standardization is likely to be increasing in both the number and complexity of written standards. Therefore, my measure of *Standardization* comes from O*NET questions about the importance and "level" (of complexity) of "evaluating information to determine compliance with standards" required in a job. This variable measures the influence that standards have on the actual work of people in the occupation. In other words, if standards exist, but are ignored, the extent of standardization in the occupation is low.

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[10] See http://www.bls.gov/soc/ for more on the occupational classification system; the most recent O*NET database is searchable online at http://www.onetonline.org/; and details on the O*NET data collection process are available at http://www.onetcenter.org/dataCollection.html

[11] O*NET does not update the data for each occupation with each update of the database. The data for bookkeepers and auditors was collected in July 2004, and for accountants in March 2003.

I estimate *Standardization* using factor analysis to identify unobserved "latent" factors that can explain the shared variance in the importance and "level" of standardization of O*NET variables.[12] Table 1 shows the factor analysis results for *Standardization* and all others estimated using factor analysis. Panel A of Table 1 shows the factors produced by the factor analysis, their eigenvalues, and the amount of the variance in the input variables they explain. I retain one factor for *Standardization* because only one has an eigenvalue greater than 1. By construction, *Standardization* explains all of the shared variance in the "importance" and "level" of standardization variables. Panel B of Table 1 shows the factors, the input variables, and their loadings. These describe the association between each input variable and the retained factor. The loadings for the input variables in the *Standardization* factor analysis are both 0.95.

I develop a multivariate model of occupational standards using occupational characteristics predicted by theory to be associated with the value of standards to an occupation, including: the difficulty of the occupation's work, litigation risk, professionalization, and the importance of innovation.

Theory suggests that the benefits of standards come from their ability to record and disseminate expert knowledge and to increase uniformity. A benefit of recording and disseminating expert knowledge is that it allows a non-expert to perform a difficult or complex task without acquiring the training and experience of an expert (Brunsson and Jacobsson 2000). However, it is also possible that, for some complex and difficult tasks, expert knowledge cannot easily be standardized because either such knowledge is tacit or the situation requires strategic interaction.[13] In such cases, expert judgment is invaluable and expert performance cannot be replicated by a non-expert using a standard (Baxter 1979).

The first independent variable, therefore, is the difficulty and complexity of the occupation's work *(Difficulty)*. I make no prediction about the sign of the coefficient because there are reasons to expect either a positive or negative association of task difficulty with standardization.[14] To construct this variable, I aggregate seven O*NET variables using factor analysis. The input variables are from survey data on the complexity of information, complexity of information analysis, complexity of decision-making processes, and amount of preparation required to perform the job. Summary definitions of all variables are in Appendix A. Table 1, Panel A shows that only one *Difficulty* factor has an eigenvalue greater than 1 and

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[12] I use factor analysis to produce several of the variables used in my tests. An alternative approach would be to use principal component analysis (PCA) to aggregate the information in several variables to create a smaller number of "principal components." PCA is often used to reduce the dimensionality of a dataset by reducing multiple variables to fewer principal components that explain the largest possible proportion of the total variance in the input variables (Johnson and Wichern 2007). PCA differs from factor analysis in that it identifies unobserved components that explain the maximum proportion of the *total* variance of the input variables. In contrast, factor analysis identifies latent factors that explain the maximum proportion of the *shared* variance of the input variables. O*NET data were not collected with the intent of performing the analyses in this study. As a consequence, O*NET variables likely measure my constructs with error. Using factor analysis reduces the role that this error plays in my tests. As a robustness check, I perform all of my tests using variables produced with PCA. The results are virtually identical.

[13] For example, it would be difficult to write a standard for how to win a chess game. Such a standard might be a large book containing thousands of pages of board configurations and rules for how to react to them. A player following a standard would be predictable, a disadvantage in a strategic game like chess. In addition, a novice would have difficulty applying the standard because identifying the part of the standard that applies to their particular situation would require that they quickly recognize board configurations. A novice would likely have trouble doing this because it is one of the abilities that distinguishes chess experts from novices (Gobet and Charness 2006).

[14] My prediction is that difficulty/complexity causes standardization but the causality could also go in the opposite direction. It may be that standards make tasks more difficult/complex than they would be without standards. I empirically examine this potential endogeneity in the "Results" section. Statistical correction for endogeneity has a small impact on the results.

TABLE 1

Results of Factor Analysis to Create Proxies for *Standardization*, *Difficulty*, *Financial Legal Risk*, *Physical Legal Risk*, and *Professionalization*

Panel A: Factors and Eigenvalues

Regression Variable	Factor	Eigenvalue	Proportion Explained	Cumulative Explained
Standardization	1	1.79	1.00	1.00
	2	0.00	0.00	1.00
Difficulty	1	5.17	0.90	0.90
	2	0.35	0.06	0.96
	3	0.15	0.03	0.99
	4	0.06	0.01	1.00
	5	0.01	0.00	1.00
	6	0.01	0.00	1.00
	7	0.00	0.00	1.00
Legal Risk Financial	1	1.23	0.97	0.97
	2	0.04	0.03	1.00
	3	0.00	0.00	1.00
Legal Risk Physical	1	1.72	0.93	0.93
	2	0.12	0.07	1.00
	3	0.00	0.00	1.00
Professionalization	1	1.67	0.82	0.82
	2	0.25	0.12	0.95
	3	0.10	0.05	1.00
	4	0.00	0.00	1.00

Panel B: Variable Loadings on Factors

	Standardization	*Difficulty*	*Legal Risk Financial*	*Legal Risk Physical*	*Professionalization*
Standards (importance)	0.95				
Standards (level)	0.95				
Analyzing data or information (level)		0.89			
Complex problem solving (level)		0.87			
Interpreting the meaning of information for others (level)		0.87			
Provide consultation and advice to others (level)		0.85			
Making decisions and solving problems (level)		0.84			
Job zone		0.82			
Judgment and decision making (level)		0.82			
Impact of decisions on co-workers or company results			0.77		

(continued on next page)

TABLE 1 (continued)

	Standardization	*Difficulty*	*Legal Risk Financial*	*Legal Risk Physical*	*Professionalization*
Consequence of error			0.57		
Responsible for outcomes and results			0.55		
Responsible for others' health and safety				0.99	
Physical harm				0.66	
Knowledge of public safety and security				0.57	
Integrity					0.78
Independence					0.75
Freedom to make decisions					0.57
State licensing					0.39

The variables used to estimate the factors are listed in Table 1. For *Standardization,* they are the importance and complexity of standards. For *Difficulty,* they are the complexity of information analyzed, the complexity of problems solved, the complexity of interpreting information for others, the complexity of consultation and advice provided to others, the complexity of decision making and problem solving, the amount of training necessary, and the complexity of judgment and decision making required to perform the job. For *Legal Risk Financial,* the input variables are the impact of decisions on co-workers or company results, the consequences of errors, and the responsibility for outcomes and results. For *Legal Risk Physical,* the input variables are the extent of responsibility of others' health and safety, a variable measuring the hazards faced by workers (*PhysHarm*), and the extent of knowledge of public health and safety required to perform the job. The input variables for *Professionalization* are the importance of integrity, the amount of independence, the freedom to make decisions, and the need for a state license to perform the job. I use the iterated principal factors estimation method. I retain factors with eigenvalues greater than 1 to estimate the proxy values. "Proportion explained" is the proportion of the shared variance in the input variables that is explained by a given factor.
Summary variable descriptions are in Appendix A.

that it explains 90 percent of the shared variance of the input variables. I retain only this factor and it is my proxy for *Difficulty*. Panel B shows that the input variables most strongly associated with the *Difficulty/Complexity* factor are *Analyzing data or information* and *Complex problem solving*.

Another benefit of standards is that they can justify decisions. One hypothesized benefit of financial reporting and auditing standards is that they reduce auditors' litigation risk (Healy and Palepu 2001; Healy 2003; Watts 2003; Bratton 2007). Auditors can use a standard to justify their actions by arguing in court that they followed best practices and, therefore, behaved responsibly. This argument applies to any occupation that places property or people at risk. If the potential litigation costs are large enough, then workers or firms will demand standards to protect against these losses.

I construct two litigation risk proxies using factor analysis, one capturing the risk of financial damage (*Legal Risk Financial*), and the second capturing the risk of physical harm (*Legal Risk Physical*). I construct the proxy for *Legal Risk Financial* from variables measuring the impact of workers' decisions on other people or on their employer, the potential consequences of an error they could commit, and their level of responsibility for work outcomes. Table 1, Panel A shows that the single retained factor explains 97 percent of the shared variance in the input variables. Panel B shows that *Impact of decisions* is most strongly associated with *Legal Risk Financial.*

I construct the proxy for *Legal Risk Physical* using O*NET measures of the extent of responsibility for other people's health and safety, the need for knowledge of public health and safety, and a composite measure based on the maximum value from O*NET measures of exposure to occupational hazards (*PhysHarm*). The single retained factor explains 93 percent of the shared variance in the input variables. Table 1, Panel B shows that *Responsible for others' health and safety* is most strongly associated with *Legal Risk Physical.*

Professions are distinguished from other occupations in ways that likely increase demand for standards. Legitimacy in the eyes of the public or the government is a critical requirement for jurisdictional control and, for professions, demonstrating professional knowledge can increase legitimacy (Abbott 1988). Accounting historians have argued that early accounting standardization efforts in the U.K. were an attempt to increase professional legitimacy in response to jurisdictional conflicts with lawyers and legitimacy-damaging public crises (Lee 1995). In addition, because there is an "asymmetry of expertise" between professions and the parties with which they contract, there may be demand in professions for mechanisms to control the quality and consistency of professional work (Abbott 1988; Freidson 2001).

The variable *Professionalization* is constructed from O*NET variables measuring occupational attributes that Freidson (2001) and Abbott (1988) suggest make professions unique. These are the importance of integrity and independence, the extent of freedom, and a measure of the prevalence of state licenses for the occupation, which I construct from the Career One Stop website. Table 1, Panel A shows that the single retained factor explains 82 percent of the shared variation in the input variables. Panel B shows that the input variable most strongly related to *Professionalization* is *Integrity.*

While there are benefits to increasing uniformity, there are costs as well. The economic environment changes and occupations need to adapt to the changes in order to stay competitive (Abbott 1988; North 2005). Competition is an effective mechanism for identifying useful innovations to the extent there is variation in competing ideas (Alchian 1950; Baxter 1962; Hayek 1968). Standards can inhibit innovation because they reduce variation both by reducing "favorable" accidents and by increasing the costs of experimentation (Benner and Tushman 2002; Cole and Matsumiya 2007). When standards are strongly enforced, experimentation beyond the bounds of the standards is inhibited due to the risk of being caught and punished. Even if standards are not enforced, there may be costs to ignoring them, such as social sanctions for failing to support a norm (Rutherford 1998). Standards are also likely to increase the litigation risk of experimentation. Just as standards protect those who follow them from litigation costs, standards may expose those who fail to follow them to increased litigation costs (Baxter 1962).[15]

For occupations that face high levels of environmental uncertainty, standardization is unattractive because it reduces the ability to adapt and compete against other occupations. Workers in these occupations are, therefore, likely to resist standardization. Thus, the final variable I expect to influence standardization is the importance of innovation.[16] The associated proxy, which I label *Innovation,* is a single variable taken from an O*NET question asking workers how important innovation is in their job.

I also control for occupation size. The proxy I use is the log of the number of full-time workers from the OES database.[17] A possibly important omitted variable is the importance of network externalities. I omit it from my model because a variable measuring it is not available. An occupation's size is likely related to the importance of network externalities because the size of the externality increases with the number of people in the network (Meeks and Swann 2009). However, size is not a perfect proxy for network externalities because it is likely a function of many variables other than the importance of network externalities.

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[15] In their review of the literature on standards in economics and accounting, Meeks and Swann (2009) argue that standardization can be both negatively and positively associated with innovation.

[16] My prediction is that the importance of innovation causes occupations to demand less standardization, but the causality could be reversed. It may be that standards cause innovation as people try to avoid the restrictions imposed by the standard. I empirically examine this potential endogeneity in the "Results" section. Statistical corrections for endogeneity have a small influence on the results.

[17] The O*NET database divides some six-digit SOC codes into smaller sub-occupations. Of the 801 occupations in O*NET, 33 are not present in OES, while 50 others are subdivided. Thirty-five occupations are divided into two subgroups, nine into three subgroups, four into four subgroups, and two into five subgroups. When occupations are subdivided in O*NET, I assume that workers are equally distributed in each O*NET subgroup.

Table 2 shows descriptive statistics for the variables used in the analyses in this section. It also shows the values and percentiles of each variable for the three accounting occupations in O*NET. Auditors' work is extremely standardized and they are subject to high financial litigation risk. Table 2 shows that auditors' value for *Standardization* is in the 99th percentile and their value for *Legal Risk Financial* is in the 76th percentile. Accountants' standardization value is also high (75th percentile), but bookkeepers' value is low (19th percentile). This suggests that high standardization is not a phenomenon that is general to all accounting tasks but rather is localized in accounting occupations that are involved with financial reporting.

Results

Table 3 shows univariate correlations between *Standardization* and the independent variables. *Standardization* is positively correlated with *Difficulty*, *Legal Risk Financial*, *Legal Risk Physical*, and *Professionalization*. *Standardization* is positively correlated with *Innovation* in my univariate analysis against predictions. It is negatively correlated with size.

Table 4 shows multivariate results based on an OLS estimation of the model and two instrumental variables estimations (IV) in Panel A, diagnostic statistics for the IV estimations in Panel B, and the residuals for accounting occupations in Panel C.[18] The first IV estimation treats *Difficulty* as endogenous and uses the occupation's age and a variable measuring the importance of soft sciences to the occupation as exogenous instruments for *Difficulty* in the first stage of the IV estimation. The second IV estimation treats both *Difficulty* and *Innovation* as endogenous and uses the occupation's age, the soft sciences measure, and an O*NET variable measuring the level of competitiveness in an occupation as instruments.[19] In Table 4, Panel B, the Hansen J statistics for both models are statistically insignificant, which is evidence that the instruments in both IV models are uncorrelated with the estimated residuals. The F-statistics for the partial R^2 of the instruments in the first-stage regression are all greater than 14, which is above the "rule of thumb" values suggested by Baum (2006) and Larcker and Rusticus (2010). This indicates that the instruments are not weak. Finally, Hausman tests fail to reject the null hypothesis that differences in the coefficient estimates of the OLS model and the 2SLS models are not systematic. Assuming that at least one of my instruments is exogenous, this is evidence that *Difficulty* and *Innovation* are not endogenous. As a result, the discussion that follows focuses on the OLS results.

I cluster errors by two-digit SOC code (22 groups) to correct for possible correlation of error terms among similar occupations. The variables that were produced by factor analysis are approximately standard normally distributed. To increase its comparability, I also standardize

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[18] I do not report goodness-of-fit measures for the instrumental variables models. Conceptually, a measure like R^2 does not capture the explanatory power of the right-hand-side variables when there are endogenous explanatory variables because there is feedback relationship between the dependent variable and the endogenous independent variable(s). Mathematically, using the formula for $R^2 = 1 - \Sigma\hat{e}^2_i/\Sigma(y_i - \bar{y})^2$, in an OLS regression R^2 must be between 0 and 1 because the term $\Sigma\hat{e}^2_i$ can never be larger than the term $\Sigma(y_i - \bar{y})^2$. This is not true for an IV model (Hill et al. 2008).

[19] Choosing proper instruments, ones that are likely to be correlated with the endogenous variable but uncorrelated with the true (unobserved) error term, is complicated here because of the lack of similar prior research. The source of the potential endogeneity in this study is reverse causality, with *Standardization* possibly causing variation in *Difficulty* and *Innovation*. It is difficult to imagine how *Standardization* causes variation in an occupation's age, its use of soft sciences knowledge, or its level of competitiveness. Therefore, I expect that the instruments are more exogenous than *Difficulty* and *Innovation*.

TABLE 2

Descriptive Statistics, Values, and Rankings for Auditors, Accountants, and Accounting Clerks for All Variables

						Auditors		Accountants		Bookkeepers	
	Mean	Med.	Min.	Max.	n	Val.	Percentile	Val.	Percentile	Val.	Percentile
Standardization	0.00	0.06	−3.03	2.70	801	1.99	99%	0.72	75%	−0.82	19%
Standards (importance)	3.32	3.37	1.24	4.99	801	4.53	99%	3.70	69%	2.52	13%
Standards (level)	3.32	3.35	0.29	6.29	801	5.53	99%	4.20	78%	2.87	35%
Difficulty	0.00	−0.04	−2.58	2.33	801	1.10	84%	1.07	84%	−0.71	25%
Analyzing data or information (level)	3.25	3.14	0.00	6.66	801	5.56	96%	4.97	89%	3.19	50%
Complex problem solving (level)	3.60	3.71	0.52	6.11	801	4.36	73%	4.25	70%	2.77	24%
Interpreting the meaning of info. for others (level)	2.94	2.85	0.00	5.94	801	3.70	75%	3.94	81%	1.75	13%
Provide consultation and advice to others (level)	2.86	2.76	0.00	6.59	801	4.31	84%	4.32	84%	1.68	20%
Making decisions and solving problems (level)	4.06	4.15	0.50	6.58	801	4.93	79%	4.59	66%	3.01	16%
Job Zone	3.00	3.00	1.00	5.00	801	4.00	86%	4.00	86%	3.00	68%
Judgment and decision making (level)	3.70	3.79	0.70	6.54	801	4.43	74%	5.35	95%	2.75	21%
Legal Risk Financial	0.00	0.00	−3.02	2.23	780	0.65	76%	−1.06	11%	−0.54	26%
Impact of decisions on co-workers or firm results	3.82	3.86	1.91	4.98	780	4.16	71%	3.42	23%	3.76	43%
Consequence of error	2.94	2.90	1.30	4.83	801	3.86	88%	1.84	4%	2.09	11%
Responsible for outcomes and results	3.15	3.17	1.10	4.85	801	3.10	47%	2.49	18%	2.70	27%
Legal Risk Physical	0.00	0.07	−2.37	2.13	801	−0.47	33%	−1.40	10%	−1.77	4%
Responsible for others' health and safety	3.07	3.14	1.00	4.94	801	2.68	34%	1.85	11%	1.51	4%
Physical harm	3.54	3.55	1.23	5.00	801	3.07	35%	1.49	0%	2.50	17%
Knowledge of public safety and security	2.61	2.55	1.00	4.79	801	1.25	2%	2.27	35%	1.65	9%
Professionalization	0.00	0.09	−2.68	1.84	780	0.65	73%	0.94	84%	0.39	64%
Integrity	4.23	4.31	2.67	5.00	780	4.55	69%	4.80	90%	4.51	66%
Independence	3.92	3.95	2.24	4.93	780	4.06	61%	4.05	59%	4.20	74%
Freedom to make decisions	4.18	4.25	2.17	5.00	780	4.02	33%	4.11	39%	4.05	35%
State licensing	0.78	0.00	0.00	5.00	801	5.00	99%	5.00	99%	0.00	68%
Importance of Innovation	0.00	0.00	−2.92	2.58	780	−0.13	45%	−0.09	47%	−0.42	32%
Occupation size	10.71	10.70	5.70	15.29	789	13.21	94%	13.21	94%	14.43	99%
Occupation age	2.88	0.00	0.00	15.00	801	15.00	99%	15.00	99%	15.00	99%
Soft science	3.11	2.98	1.00	5.00	801	2.96	49%	3.58	74%	2.10	10%
Level of competition	2.98	2.94	1.41	4.84	780	3.46	80%	2.33	13%	2.95	51%
Error	0.00	0.02	−2.57	1.72	777	1.09	95%	0.26	64%	−0.20	38%

Variable descriptions are in Appendix A.

TABLE 3

Pearson Correlations between Variables in Standardization Regression[a]

	Standardization	*Difficulty*	*Legal Risk Financial*	*Legal Risk Physical*	*Professionalization*	*Innovation*	*Occupation Size*
Standardization							
Difficulty	0.61						
	0.00						
Legal Risk Financial	0.45	0.37					
	0.00	*0.00*					
Legal Risk Physical	0.22	−0.06	0.49				
	0.00	*0.11*	*0.00*				
Professionalization	0.34	0.59	0.28	−0.17			
	0.00	*0.00*	*0.00*	*0.00*			
Innovation	0.18	0.57	0.15	−0.15	0.61		
	0.00	*0.00*	*0.00*	*0.00*	*0.00*		
Occupation Size	−0.06	−0.21	−0.13	0.02	−0.09	−0.18	
	0.07	*0.00*	*0.00*	*0.58*	*0.01*	*0.00*	

Italicized rows are p-values.

The sample comes from the O*NET database maintained by the U.S. Department of Labor (DOL). The unit of analysis is the occupation. *Standardization* is a measure of the level of standardization in each occupation. *Difficulty* is a measure of the difficulty or complexity of an occupation's work. *Legal Risk Financial* is a measure of the extent to which the work of the occupation puts people at risk of financial loss. *Legal Risk Physical* is a measure of the extent to which the work of the occupation puts people at risk of physical injury. *Professionalization* is a measure of the extent to which an occupation has become professionalized. *Innovation* is a measure of the importance of innovation to the work of the occupation. *Occupation Size* is the log of the number of workers in the occupation.

[a] Spearman correlations are virtually identical to those presented.

Innovation. The OLS model explains 46 percent of the within-sample variation in standardization.[20,21]

Table 4, Panel A shows that the relationship between *Standardization* and *Difficulty/Complexity* is positive and statistically significant. This is consistent with the argument that, on average, standards are valuable for difficult tasks because they allow non-experts to perform them with greater expertise. *Standardization* is also positively and significantly associated with the risk of damage to property, the risk of damage to people, and *Professionalization*. The coefficient on *Innovation* is negative and highly statistically significant. This supports the proposition that standards are costly in unstable environments and that innovative occupations anticipate this and resist standardization. The coefficient on *Occupation Size* is positive but not significantly different from zero.

The residuals from this regression model represent the deviation between the actual and predicted levels of *Standardization* for a given occupation. These residuals are listed for auditors, accountants,

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[20] O*NET includes a variable called "recommend suppress," which is a dummy variable intended to flag low-precision estimates. The variable description in O*NET says, "[A]n estimate is considered to have low precision if any of the following are true: (1) the sample size is less than 10; (2) the variance is 0 and the sample size is less than 15; (3) the relative standard error (RSE) is greater than 0.5. (The RSE of a mean estimate is the ratio of the estimate's standard error to the estimate itself)." When I exclude the 43 occupations for which any of my regression variables is flagged "recommend suppress," the results remain the same.

[21] The independent variables I use in the Table 4 regression are fairly highly correlated and multicollinearity could potentially cause the coefficient estimates to be imprecise. I compute variance inflation factors (VIFs) and find that the highest is 2.09, well below the "rule of thumb" cutoff of 10 (Baum 2006).

TABLE 4

Multivariate Model of Standards in Occupations

Panel A: Regression Results

	Predicted Sign	Model 1[a]	Model 2[b]	Model 3[c]
Constant		−0.321	−0.312	−0.430
Difficulty	?	0.643***	0.636***	1.387***
Legal Risk Financial	+	0.155**	0.157**	−0.121
Legal Risk Physical	+	0.183***	0.182***	0.270***
Professionalization	+	0.105*	0.108	0.536**
Innovation	−	−0.217***	−0.215***	−1.373**
Size	+	0.030	0.029	0.037
R^2		0.460		
Observations		777	777	777

Panel B: IV Estimation Diagnostics

Partial R^2 of Instrumental Variables from First-Stage Regression	Model 2[b]	Model 3[c]
Difficulty	0.12	0.18
(F-value)	(53.23)	(14.93)
Innovation		0.09
(F-value)		(18.73)
p-value of Hansen J test of over-identifying restrictions	0.52	0.31
p-value of Hausman test	1.00	0.31

Panel C: Residuals for Accounting Occupations

Auditors' Residual Percentile	95%
Accountants' Residual Percentile	64%
Bookkeepers Residual Percentile	38%

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*, **, *** Represent statistical significance at the $p = 0.10$, 0.05, and 0.01 levels, respectively.

p-values (in parentheses) are one-tailed for all variables except Difficulty for which I could not make a directional prediction.

The sample comes from the O*NET database maintained by the U.S. Department of Labor (DOL). The unit of analysis is the occupation. The dependent variable is *Standardization*, which is a measure of the level of standardization in each occupation. *Difficulty* is a measure of the difficulty or complexity of an occupation's work. *Legal Risk Financial* is a measure of the extent to which the work of the occupation puts people at risk of financial loss. *Legal Risk Physical* is a measure of the extent to which the work of the occupation puts people at risk of physical injury. *Professionalization* is a measure of the extent to which an occupation has become professionalized. *Innovation* is a measure of the importance of innovation to the work of the occupation. *Size* is the log of the number of workers in the occupation. Errors are clustered by two-digit SOC code. "Auditors'," "Accountants'," and "Bookkeepers'" Residual Percentile describes the location of the regression residual for these occupations in the distributions of all regression residuals in the sample.

[a] Model 1 is the following equation estimated using OLS:

$$Standardization_i = \alpha + \beta_1 Difficulty_i + \beta_2 Legal\ Risk\ Financial_i + \beta_3 Legal\ Risk\ Physical_i + \beta_4 Professionalization_i + \beta_5 Innovation_i + \beta_6 Size_i + \varepsilon_i.$$

[b] Model 2 treats *Difficulty* as endogenous. It is estimated using 2SLS with *Age* and *Soft Science* as instruments.

[c] Model 3 treats both *Difficulty* and *Innovation* as endogenous. It is estimated using 2SLS with *Age*, *Soft Science*, and *Level of Competition* as instruments.

and bookkeepers in Panel C of Table 4. Auditors' residual is the most positive of the three (95th percentile). Accountants are in the 64th percentile, and bookkeepers are in the 38th percentile.[22]

This evidence indicates that the primary model explains about half of the variation in standardization within my sample, but does a poor job of explaining standardization in auditing. The model performs better for accountants, with a moderate positive residual, and bookkeepers, with a moderate negative residual. This suggests that the model predicts well for accounting occupations involved with the *recording* function of accounting, which is controlled by individual firms, but not the *reporting* function of accounting, which is governed more by standard-setters.

The model allows me to estimate residual standardization for any occupation in the sample, including other learned professions. There is not a well-accepted list of occupations that are considered to be professions (Abbott 1988; Macdonald 1995; Freidson 2001). Nevertheless, to get a better understanding of how the accounting profession compares against other professions, I take a closer look at 22 occupations including clergy, law, medicine, accounting, engineering, dentistry, and airline pilots that are frequently considered in the literature to be professions. Not all professions on this list are highly standardized, with *Standardization* values ranging from a low of the 49th percentile (clergy) to a high of the 95th percentile (auditors). The model has mixed success explaining the standardization of these professions. Auditors have the largest positive residual of any of them (94.9th percentile). Other professions with large positive residuals include actuaries (79th percentile) and environmental (94.6th), aerospace (91st), electrical (77th), and chemical (64th) engineers. Professions with large negative residuals include family doctors (2nd percentile), surgeons (9th), clergy (9th), anesthesiologists (16th), psychiatrists (20th), and computer hardware engineers (28th). The standardization of many other professions, including lawyers, airline pilots, and mechanical, civil, biomedical, and agricultural engineers is predicted well by the model, with residuals between the 40th and 60th percentiles.

The results in Table 4 are robust to alternative specifications of the dependent variable. Surveys of workers in various occupations provide the data I use to construct many of the variables included in the regression model. This creates the risk that my model is impacted by perceptions rather than entirely by objective reality. To correct for this possibility, I re-estimate the main regression using values for *Standardization* from an earlier version of O*NET (version 4.0), which contains values produced by "occupational analysts" employed by O*NET (see footnote 5). The results of this change (untabulated) are that the coefficients on some of the variables become less statistically significant and the R^2 falls to 36 percent. The residuals for the accounting occupations also become less positive. The residual for auditors moves to the 84th percentile, accountants to the 31st percentile, and bookkeepers to the 10th percentile. This evidence does not overturn any inferences, but does suggest that the associations I document are affected by respondents' perceptions.

Because workers in different jobs likely have different characteristics, the data they provide are likely to be noisy. For instance, it is possible that a variable like *Difficulty* will be understood differently by surgeons than it is by lifeguards. It is therefore potentially problematic to assume that the cardinal values in O*NET can be compared. One method for relaxing this assumption is to transform the raw variables into ranks. This requires the somewhat weaker assumption that the ordinal rank of the variables can be compared. When I do so, I find results (untabulated) similar to those in Table 4. Auditors' residual is in the 87th, accountants in the 76th, and bookkeepers in the 12th percentiles.

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[22] It is possible that this result is driven by an over-reaction by accountants and auditors to the Sarbanes-Oxley Act of 2001 (SOX). My data come from the O*NET 12.0 database, which contains data collected from 2000 to 2007. To examine the impact of SOX, I use the O*NET 4.0 database, which contains only data collected before 2001. The data show that the results cannot be explained by SOX. The values for *Standardization* were also high prior to 2001. In O*NET 4.0, auditors had the 22nd- and 3rd-highest assessments of the importance and level of standards, respectively. This compares with O*NET 12.0, which I use in this study, in which auditors had the 12th- and 6th-highest values for these variables.

The findings indicate that the high positive residual for auditors and the low percentile residual for bookkeepers are robust to these alternative regression specifications. The results for accountants are less robust.

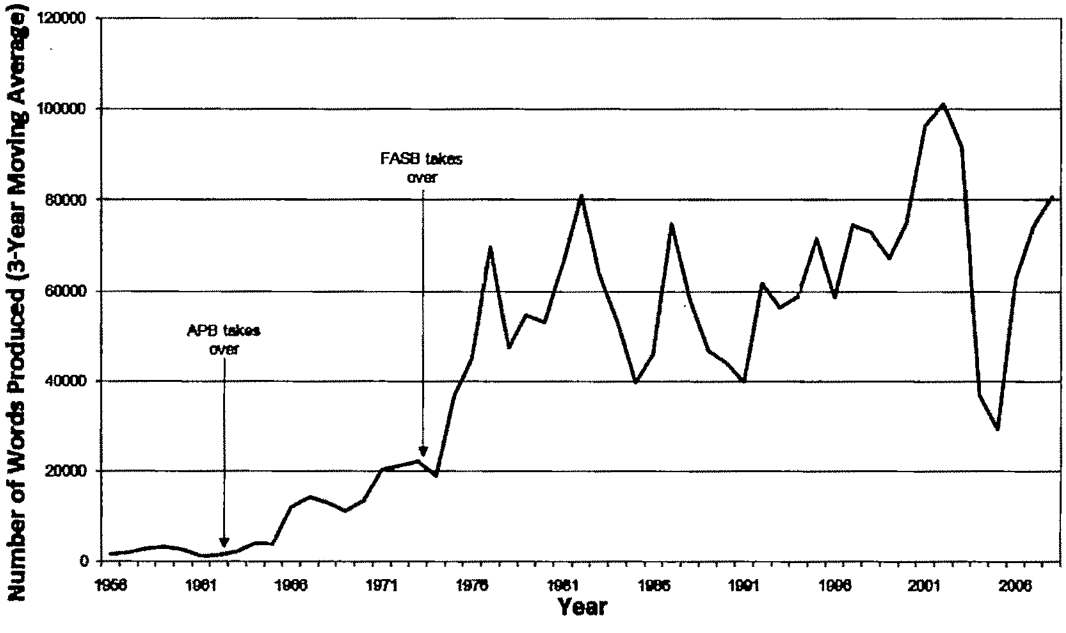
IV. STANDARD-SETTERS AND ACCOUNTING DIALOGUE

Table 4 suggests that financial reporting occupations in the early 2000s were more standardized than would be expected given their characteristics, a condition that likely has costs. Since the earliest days of accounting regulation, professional accountants have feared that "rigid uniformity" in financial reporting would tend to "put an end to progress" (May 1953, 251; also see Anonymous 1906; Rappaport 1965; Merino and Coe 1978). Baxter (1962) argues that one mechanism by which authoritative standards limit progress is altering the nature of professional accounting discourse.

Figure 2 shows a time-series of the number of words in new accounting standards from 1954 to 2008. There was a consistent increase in standard-setter output over the sample period, with output increasing from an average of 2,498 words per year in the CAP period to 13,175 words per year in the APB period to 59,207 words per year in the FASB period, a greater than 27-fold increase.

In this section, I study how accounting standardization affected professional accounting dialogue. The data are citations from editions of the *Accountants' Handbook*, an accounting reference manual for business people. It shows the influence of various parties on accounting thought between 1923 and 2007. These data enable me to evaluate Baxter's (1962) claim that

FIGURE 2
Words in New Accounting Standards: Accounting Research Bulletins (CAP), Accounting Principles Board Opinions (APB), and Statements of Financial Accounting Standards (FASB)



increasing standard-setter influence could fundamentally alter the nature of professional dialogue and, by implication, the intellectual development of the accounting profession.

Data

I use citations as proxy measures for the breadth of participation by various groups in the professional accounting dialogue. I hand-collect citation data from eight editions of the *Accountants' Handbook* published in 1923 (1st), 1932 (2nd), 1943 (3rd), 1956 (4th), 1970 (5th), 1981 (6th), 1991 (7th), and 2007 (11th) (Saliers 1923; Paton 1932; Paton 1943; Wixon 1956; Wixon et al. 1970; Seidler and Carmichael 1981; Carmichael et al. 1991; Carmichael et al. 2007).[23] The *Handbook* is a useful data source for measuring professional dialogue because of its longevity, comprehensiveness, and consistency. Its goal has been "to provide in a single reference source an answer to all reasonable questions on accounting and financial reporting that might be asked by accountants, auditors, executives, bankers, lawyers, financial analysts, and other users and preparers of accounting information" (Carmichael et al. 1991, XV). A review of the second edition says that the first was "one of the most popular and successful works ever published in the field of accounting" (Graham 1932, 205). By the 1960s, it was recognized as "the standard reference work" (Zeff 1963, 883). Table 5 shows the year of publication, the names of the editor(s), the number of contributors, the qualifications of the contributors, and the number of pages for each edition.[24]

Citations have been used in many fields to study how ideas evolve (White 2004). Recent progress has been made toward a theory of citation in the field of scientometrics, the science of quantifying and analyzing science (Leydesdorff 1999). This literature finds that citations are primarily used to persuade the reader, but are also frequently used to give credit to the cited party (Brooks 1985, 1986; Leydesdorff 1999; Wouters 1999; White 2004).

I collect citation data from chapters on three topics: financial statements: form and content, production costs, and intangible assets. These topics were chosen because I could develop *ex ante* expectations about their sensitivity to financial reporting standards. This likely helps me rule out alternative explanations for changes in citations over time. Discussions of financial statements can be expected to be highly sensitive to standard-setters because the Securities Acts, from which standard-setters derive their authority, are considered disclosure regulations, and financial statements are a primary vehicle for disclosure. Production cost accounting, which is a management accounting topic, is largely independent of financial reporting standards and, thus, is unlikely to be affected by standard-setters. Before collecting data from the *Handbook*, I was concerned that each section might not be updated for each new edition, resulting in outdated citations. To protect against this possibility, I chose to code a third section on a topic that has been consistently controversial over the sample period: intangible assets (Yang 1927; Hand and Lev 2003). I expect the citations in the intangibles section to be most timely.

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[23] Editions of the *Handbook* were published with increasing frequency after 1980, as the preface to the 6th edition explains, due to the "explosion in scope and complexity of accounting principles and practices" that occurred between 1970 and 1981. In addition, some changes were made in the 6th edition. The *Handbook* was split into two volumes, the number of sections increased to 45 from the 28 in the 5th edition, the contributors were more likely to be specialist practitioners and less likely to be academics, and, because it became "almost impossible for anyone to be a general expert in accounting," sections were, for the first time, signed by their individual authors (Seidler and Carmichael 1981, v). I selected the editions from which to gather data in order to get about one book a decade and to include the most recent edition.

[24] I argue that the *Handbook* is an excellent source of data with which to construct proxy measures of the participation of various parties in the accounting dialogue, but it has some limitations. Each edition is overseen by an editor or team of editors whose idiosyncrasies could influence the results. However, the reader should note that the choice of editors is endogenous. The book's publishers had incentives to choose editors who would appeal to the largest possible audience at the time the books were published. These incentives reduce the chances that the *Handbook* editors had opinions that were extremely idiosyncratic.

TABLE 5

Descriptive Information about the *Accountants' Handbook*

Edition	Year	Editor	Number of Contributors	% Ph.D.	% CPA or CA	Total Pages
1	1923	Earl. A. Saliers	19	11%	42%	1,675
2	1932	W. A. Paton	77	31%†	†	1,742
3	1943	W. A. Paton	89	39%†	†	1,505
4	1956	Rufus Wixon Walter G. Kell	30	67%	80%	1,541
5	1970	Rufus Wixon Walter G. Kell Norton M. Bedford	50	72%	74%	1,523
6	1981	Lee J. Seidler D. R. Carmichael	57	30%	75%	2,068
7	1991	D. R. Carmichael Steven B. Lilien Martin Mellman	56	21%	82%	1,378
11	2007	D. R. Carmichael O. Ray Whittington Lynford Graham	69	20%	87%	1799

† The 2nd and 3rd editions do not list contributors' degrees and designations. I counted the number of contributors described as "Professor" or "Dean" as contributors with Ph.D.s. I was unable to count the number of CPAs for these editions.

To construct my sample, I first randomly select ten pages each from three chapter types in each edition and record all citations on those pages. I exclude pages that contain large figures or tables so that all sampled pages are at least three-quarters text. In most cases, the citations were unambiguous and the process was straightforward.[25]

After identifying individual citations, I classify them into five groups based on the extent of explicit coordination in them. I label the group with the least explicit coordination "norms." This group includes citations to general acceptance, orthodox accounting, accounting practice in general, business in general, business associations, and case law. The second, labeled "experts," encompasses citations to journals, books, specific experts, research, writers, and authorities. The third, "profession," is made up of citations to the American Institute of Certified Public Accountants (AICPA), American Accounting Association (AAA), and National Association of Cost Accountants (NACA). The fourth, "regulation," includes citations to regulators that influenced accounting practice before the SEC, like the Interstate Commerce Commission (ICC), various state public utilities commissions, and the U.S. Treasury. The "regulation" category also includes cites of the Securities and Exchange Commission (SEC). The final category, "standards," encompasses citations to the CAP, APB, and FASB. These are separated from the "regulators" category because they have been the primary source of accounting standards.

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[25] A research assistant without knowledge of this study's hypotheses recoded about 10 percent of the pages that I coded. Excluding norms citations, our data matched in 82 percent of cases. The norms citations did not match as consistently (41 percent). This was mostly because the independent coder recorded more norms citations than did I. To be more specific, the independent coder was more likely to count a statement that something "usually," "seldom," or "commonly" occurred as a citation to norms. This raises concerns about the quality of the norms citation data. In untabulated supplementary tests, I exclude all norms citations and find that the results remain essentially the same.

Results

Table 6 presents descriptive data on the number of citations per page and the proportion of citations to each of the six citation groups. I consider the number and diversity of participants in the dialogue to be a function of both the number of citations per page (citation density), and the distribution of citations among contributor groups. The groups in each panel are arranged according to the extent of explicit coordination in them. As a result of this arrangement, when citations are concentrated in the top of the table, the dialogue has more participants and is more diverse than when they are concentrated in the bottom of the table.

Panels A and B of Table 6 show a dramatic change in the distribution of citations after the 1970 edition. In Panel A (financial statements), the proportion of citations to standard-setters jumps from 14 percent to 50 percent between the 1970 and 1991 editions. Similarly, in Panel B (intangible assets), citations to standard-setters increase from 5 percent in 1970 to 40 percent in 1991 and climb to 68 percent in 2007. There is no similar jump in Panel C (production cost accounting), where standards are only cited in the 1970 edition and comprise only 2 percent of all citations in that edition.

The contrast between Table 6, Panels A and B versus Panel C with regard to accounting experts is also interesting. Citations to experts increased in all panels between 1923 and 1932, the pre-standard-setter period. But citations to experts decline monotonically in all periods in which there is a standard-setter in the financial accounting sections (Panels A and B), while they continue to increase over time in the production cost accounting chapters (Panel C). The only exception is in the intangible assets section, where they increase between 1932 and 1943, the first period in which standard-setters had any influence.

Table 7 displays a statistical analysis of the citation data, the sample period of which is divided into three time frames.[26] The first covers the 1923 and 1932 editions of the *Handbook* and is called the *pre-standard-setters* period. The second covers the 1943, 1956, and 1970 editions and is called the *CAP and APB* period. The third covers the 1981, 1991, and 2007 editions and is called the *FASB* period. Each panel displays data for the production cost accounting section separate from the data for financial accounting sections. Panel A displays the references to standard-setters as a percentage of total references. In Panel A, the unit of analysis is an individual citation and the statistical tests are tests for differences in proportion.[27] Panel A shows that the large increases in the proportion of citations to standards in the financial accounting sections apparent in Table 6 are statistically significant. There is no statistically significant intertemporal change in the production cost chapters. This is evidence that the relative influence of standard-setters increased significantly over time in financial accounting.

Panels B and C of Table 7 show changes in the citations per page to standard-setters and non-standard-setter groups. This analysis is informative about the absolute influence of standard-setters and other groups. The unit of analysis is a page from the *Handbook*. The statistical tests are t-tests and assume unequal variances. Similar to Panel A, Panels B and C show no statistically significant changes in the citations per page from the production cost

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[26] Note that the values in Table 7 do not always match those that can be calculated from Table 6. This is because the values in Table 6 for the 1956, 1970, 1991, and 2007 editions are weighted to correct for differences in page size while the values in Table 7 are not weighted. Weighting the values before performing the Table 7 analysis changes the values very little and changes no inferences.

[27] These are similar to t-tests but are adjusted to account for the mean-variance relationship with binary variables (Stata Press 2001).

TABLE 6

Citations in the *Accountants' Handbook*

Panel A: Financial Statements: Form and Content

	Citations per Page								
Categories	**1923**	**1932**	**1943**	**1956***	**1970***	**1981**	**1991***	**2007***	**Ave.**
Norms	1.00	1.30	1.70	2.96	3.34	2.60	1.25	0.58	1.84
Experts	1.00	1.80	1.30	0.81	0.37				0.66
Profession			0.40	2.25	1.11	0.20		0.49	0.56
Regulation	0.20	0.40	0.60	1.89	1.39	0.50	0.17	0.16	0.66
Standards			0.20	0.63	1.02	0.60	1.42	1.32	0.65
Total	2.20	3.50	4.20	8.53	7.23	3.90	2.84	2.55	4.37

	Proportion of Citations per Year								
Categories	**1923**	**1932**	**1943**	**1956**	**1970**	**1981**	**1991**	**2007**	**Ave.**
Norms	45%	37%	40%	35%	46%	67%	44%	23%	42%
Experts	45%	51%	31%	9%	5%				18%
Profession			10%	26%	15%	5%		19%	9%
Regulation	9%	11%	14%	22%	19%	13%	6%	6%	13%
Standards			5%	7%	14%	15%	50%	52%	18%

Panel B: Intangible Assets

	Citations per Page								
Categories	**1923**	**1932**	**1943**	**1956***	**1970***	**1981**	**1991***	**2007***	**Ave.**
Norms	2.10	1.80	1.20	1.71	1.39	0.90	1.17	0.74	1.38
Experts	0.40	1.10	1.90	1.80	1.39	0.90	0.17		0.96
Profession			0.10	0.09	0.09	0.10	0.17	0.41	0.12
Regulation	0.20	0.80	0.80	1.17	1.02		0.92	0.41	0.66
Standards				0.09	0.19	0.80	1.59	3.29	0.74
Total	2.70	3.70	4.00	4.85	4.08	2.70	4.01	4.85	3.86

	Proportion of Citations per Year								
Categories	**1923**	**1932**	**1943**	**1956**	**1970**	**1981**	**1991**	**2007**	**Ave.**
Norms	54%	49%	30%	35%	34%	33%	29%	15%	35%
Experts	10%	30%	48%	37%	34%	33%	4%		25%
Profession			3%	2%	2%	4%	4%	8%	3%
Regulation	36%	22%	20%	24%	25%		23%	8%	20%
Standards				2%	5%	30%	40%	68%	18%

(continued on next page)

TABLE 6 (continued)

Panel C: Production Costs

	Citations per Page								
Categories	**1923**	**1932**	**1943**	**1956***	**1970***	**1981**	**1991***	**2007***	**Ave.**
Norms	1.60	0.80	0.60	0.53	1.67	0.90			1.03
Experts	0.30	0.80	0.70	1.89	1.58	1.20			1.08
Profession		0.20			0.74	0.20			0.19
Regulation					0.28	0.10			0.06
Standards					0.09				0.02
Total	1.90	1.80	1.30	2.52	4.35	2.40			2.38

	Proportion of Citations per Year								
Categories	**1923**	**1932**	**1943**	**1956**	**1970**	**1981**	**1991**	**2007**	**Ave.**
Norms	84%	44%	46%	25%	38%	38%			46%
Experts	16%	44%	54%	75%	36%	50%			46%
Profession		11%			17%	8%			6%
Regulation					6%	4%			2%
Standards					2%				0%

* The number of words per page differs by small amounts in the different editions of the *Accountants' Handbook*. To make the citations per page numbers comparable between editions, I estimate the number of words per page in each edition, and standardize them. I take the 1923, 1932, and 1943 editions as a baseline and test for statistical differences in words per page between each edition and the words per page in the first three editions. The 1956, 1970, 1991, and 2007 editions have more words per page than the others. I standardize the raw numbers by multiplying them by a deflator equal to the baseline words per page divided by the words per page for a given edition.

chapters over time.[28] However, there are significant changes for financial accounting. Panel B shows that the citations per page to standards increase monotonically. The increases are statistically significant.

If accounting standard-setting crowds other groups out of the professional dialogue, then I expect that the absolute number of citations to non-standard-setter groups will fall, concurrent with the increase in citations to standard-setters. Panel C of Table 7 shows that the citations per page to non-standard-setters increased between the pre-standard-setters period and the CAP and APB period. This finding is inconsistent with standard-setters crowding other groups out of the dialogue.[29] However,

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[28] When I exclude all norms citations from the analysis, I find a statistically significant increase in citations to non-standard-setters between the pre-standard-setters period and the CAP and APB period. This is the only result that changes when I exclude norms citations.

[29] This unexpected finding could be explained by differences between the FASB and its predecessor, the APB, as proposed by Zeff (1986) in his examination of the fall off in advocacy writing by the Big 8 auditing firms in the 1970s. The APB was a subsidiary of the AICPA and was dominated by the major accounting firms. Given this structure, and the emphasis placed by the SEC on "substantial authoritative support," the audit firms believed they could best influence the SEC and the standard-setting process by engaging in public debates about accounting issues. When the FASB replaced the ABP, the SEC stated that it would rely primarily on the FASB's advice to determine which accounting practices had "substantial authoritative support." The Big 8 concluded that they could influence standards better through directly lobbying than through writing persuasive articles (Zeff 1986). It is possible that the FASB's apparently unique influence over professional accounting dialogue is another consequence of the power given to the FASB to determine which practices have "substantial authoritative support."

TABLE 7

Statistical Analyses of Citations from the Accountants' Handbook

Panel A: References to Standard-Setters as a Percentage of Total References

Accounting Topic	Time Period	n	Value	Expected Sign of Change	Change
Cost Accounting	Pre-standard-setters	37	0.00%		
	CAP and APB	88	1.14%	?	1.14%
	FASB	25	0.00%	?	−1.14%
Financial Accounting	Pre-standard-setters	133	0.00%		
	CAP and APB	353	6.52%	+	6.52%***
	FASB	303	53.10%	+	46.62%***

Panel B: Number of References per Page to Standard-Setters

Accounting Topic	Time Period	n	Value	Expected Sign of Change	Change
Cost Accounting	Pre-standard-setters	20	0.000		
	CAP and APB	30	0.031	?	0.031
	FASB	10	0.000	?	−0.031
Financial Accounting	Pre-standard-setters	40	0.000		
	CAP and APB	60	0.354	+	0.354***
	FASB	60	2.334	+	1.980***

Panel C: Number of References per Page to Non-Standard-Setter Sources

Accounting Topic	Time Period	n	Value	Expected Sign of Change	Change
Cost Accounting	Pre-standard-setters	20	1.850		
	CAP and APB	30	2.692	?	0.842
	FASB	10	2.500	?	−0.192
Financial Accounting	Pre-standard-setters	40	3.325		
	CAP and APB	60	5.127	−	1.802†††
	FASB	60	2.123	−	−3.005***

*** Indicates statistical significance at the p = 0.001 level.

††† Signifies statistical significance at the p = 0.001 level but in the direction opposite of the prediction.

The data are citations from eight editions of the *Accountants' Handbook*. In Panel A, the unit of analysis is the citation, and the statistical tests are tests of differences in proportion (using the prtest command in Stata). In Panels B and C, the unit of analysis is the page, and the statistical tests are t-tests.

the citations per page to non-standards groups fell significantly between the CAP and APB period and the FASB period. This finding is consistent with other groups being crowded out of the professional dialogue, as well as the evidence in Zeff (1986) that large auditing firms ended their advocacy writing in professional publications after the FASB was established.

The evolution of the *Handbook*'s discussion of financial statements illustrates how the nature of the dialogue changed. In the first and second editions, the discussion was based on norms. The first edition says, without citing a source, that the chief purposes for which enterprises issue financial statements are "1. To meet the requirements of management. 2. To meet the requirements of investors. 3. To meet the requirements of governmental regulations" (Saliers 1923, 320). The third and fourth editions cite a number of academic sources engaged in a debate about whether firms should issue many sets of single-purpose financial statements targeted to specific user groups in place of a single general-purpose set of financial statements (Paton 1943, 13; Wixon 1956, 2.8–2.9). The first discussion of the reporting requirements of the SEC appears in the fourth edition. Through the sixth, seventh, and eleventh editions, the discussion becomes centered on the pronouncements of the APB and FASB.

The evidence in this section demonstrates that there is a temporal association between accounting standardization and the size and diversity of the network participating in the dialogue about financial accounting. The inhibiting effect of standard-setting on accounting dialogue is isolated to the FASB period. As standard-setters receive more citations in the *Handbook*'s financial accounting chapters, other more diverse groups receive fewer citations. This evidence is consistent with Baxter's (1962) prediction that standardization narrows accounting discourse.

V. CONCLUSIONS

Increasing standardization was surely one of the most important developments in accounting during the 20th century (Baxter 1979; Jamal and Sunder 2007). In this study, I examine the level of accounting standardization across occupations and over time.

I model standardization in U.S. occupations as a function of their characteristics. This model provides a benchmark for the efficient level of accounting standardization. The model is also informative about the occupational features that influence the costs and benefits of standards in occupations. I find a positive and significant association between standardization and task difficulty, litigation risk, and professionalization. This is consistent with the theory that standards are useful for simplifying complex tasks, reducing litigation risk, and enhancing professional legitimacy. I find a negative and significant association between standardization and the importance of innovation. This is consistent with the theory that occupations operating in uncertain environments resist standardization because it limits their ability to innovate. These findings can potentially help explain past changes in the extent of standardization in accounting. For example, increases in litigation risk faced by accounting professionals over time could have increased their demand for standards (Basu 1997).

Auditors, the accounting occupation most involved with financial reporting, have a large positive deviation from the benchmark. Residual standardization for accountants and bookkeepers is lower, suggesting that inefficiently high standardization is not statistically associated with forces common to all accounting occupations. Thus, formal standard-setting bodies like the FASB, IASB, and PCAOB, which largely influence financial accounting but not routine bookkeeping, are likely a major force leading to the high level of standardization observed for auditors.

I present data showing that the influence of standard-setters in financial reporting discourse increased after FASB's establishment, while the influence of professional accountants, business organizations, and especially accounting experts declined during the same period. The findings are consistent with a "crowding out" effect, whereby standard-setters reduce the breadth of the professional accounting dialogue. The isolation of this effect to financial accounting topics suggests that standard-setters exert important indirect influences over the accounting profession.

While the data in this study come exclusively from the United States, the results have implications for regulators around the world. The evidence in this study suggests that in the U.S., financial reporting is more standardized than would be efficient. Perhaps the most important questions raised by this result are: Why is this so and can it be fixed? A possible cause is that standard-setters are evaluated by their political sponsors using the only readily understandable performance metric available, their output of standards (Sunder 1988). One implication is that standard-setters may have incentives to produce as many standards as their budgets allow, rather than seek an efficient level of standardization (Sunder 1988). Another possible answer is that standard-setters lack credible information about the costs and benefits of their standards, forcing them to guess about how to increase the efficiency of their standards (Sunder 2005; Meeks and Swann 2009). The proposal that the SEC allow multiple standard-setters to compete in the U.S. is one potential innovation that could help accounting standard-setters gather better information, through market feedback, about the effects of their standards (Jamal and Sunder 2007). If such incentives and information problems exist for U.S. standard-setters, then they may also threaten similarly organized standard-setters in other jurisdictions, like the IASB. This is an important direction for future research.

This study examines one of the major consequences of inefficient standardization proposed in the literature, a narrower professional dialogue. But there is another, possibly more costly, potential consequence of inefficient standardization that I do not examine here: poorer quality accounting education (Sunder 2010). Future research could examine changes in accounting education directly, using data from accounting curricula over time, or indirectly, by examining changes in how accountants perform in competitive labor markets.

Just as the cost/benefit analyses of standard-setters are incomplete because many of the costs and benefits of standardization are not easily measurable, a full analysis of social costs and benefits associated with standardization is impossible until more is known about the consequences of standardization. The ubiquity of standards not only for accounting around the world, but also in every occupation in the United States suggests that there are significant benefits to standardization. But these benefits carry with them costs like potential future discoveries that are never made and potential future accountants who choose another profession. Occupations that remain successful over the long term do so, in part, because they balance the costs and benefits of standardization better than their competitors. For this reason, viewing accounting occupations in the context of other successful occupations is a valuable exercise. Evidence from this study supports the conclusion that accounting standardization is greater than expected and has fundamentally altered the character of professional dialogue in accounting. These results suggests that conducting future research that allows us to better understand the full range of consequences associated with accounting standardization is an important endeavor.

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APPENDIX A

VARIABLE DEFINITIONS

Name	Description	Source
Standards (importance)	Survey responses to the question, "How important is evaluating information to determine compliance with standards to the performance of your current job?"	O*NET
Standards (level)	Survey responses to the question, "What level of evaluating information to determine compliance with standards is needed to perform your current job?"	O*NET
Analyzing Data or Information (level)	Survey responses to the question, "What level of analyzing data or information is needed to perform your current job?"	O*NET
Complex Problem Solving (level)	Survey responses to the question, "What level of complex problem solving is needed to perform your current job?"	O*NET
Interpreting the Meaning of Information for Others (importance)	Survey responses to the question, "How important is providing consultation and advice to others to the performance of your current job?"	O*NET
Provide Consultation and Advice to Others (importance)	Survey responses to the question, "How important is providing consultation and advice to others to the performance of your current job?"	O*NET
Making Decisions and Solving Problems (level)	Survey responses to the question, "What level of making decisions and solving problems is needed to perform your current job?"	O*NET
Job Zone	A ranking by O*NET's "occupational analysts" of the amount of preparation needed to perform a job.	O*NET

(continued on next page)

APPENDIX A (continued)

Name	Description	Source
Judgment and Decision Making (level)	Survey responses to the question, "What level of judgment and decision making is needed to perform your current job?"	O*NET
Impact of Decisions on Co-Workers or Company Results	Survey responses to the question, "In your current job, what results do your decisions usually have on other people or the image or reputation or financial resources of your employer?"	O*NET
Consequence of Error	Survey responses to the question, "How serious a mistake can you make on your current job (one you can't easily correct)?"	O*NET
Responsible for Outcomes and Results	Survey responses to the question, "How responsible are you for work outcomes and results of other workers on your current job?"	O*NET
Responsible for Others' Health and Safety	Survey responses to the question, "How responsible are you for the health and safety of other workers on your current job?"	O*NET
Physical Harm	O*NET surveys ask workers several questions of the form, "In your current job, how often are you exposed to (hazard)?" where hazards include very hot or very cold temperatures, extremely bright or inadequate lighting conditions, sounds and noise levels that are distracting and uncomfortable, whole body vibration, hazardous equipment, hazardous conditions, high places, diseases or infection, radiation, and contaminants. *PhysHarm* is equal to the maximum value across these questions.	O*NET
Knowledge of Public Safety and Security (importance)	Survey responses to the question, "How important is public safety and security knowledge to the performance of your current job?"	O*NET
Integrity	Survey responses to the question, "How important is integrity to the performance of your current job?"	O*NET
Independence	Survey responses to the question, "How important is independence to the performance of your current job?"	O*NET
Freedom to Make Decisions	Survey responses to the question, "In your current job, how much freedom do you have to make decisions without supervision?"	O*NET
State Licensing	State licensing requirements are available from the Career One Stop Licensed Occupations website. To create this variable, I randomly selected five U.S. states: Arkansas, Kentucky, Texas, Arizona, and Rhode Island. State Licensing is equal to the number of these states that require a license for the six-digit SOC code of an occupation. The value of State Licensing is therefore integer values between 0 and 5.	Career One Stop Licensed Occupations
Importance of Innovation	Survey responses to the question, "How important is innovation to the performance of your current job?"	O*NET

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APPENDIX A (continued)

Name	Description	Source
Occupation Size	Occupation Size is an estimate of the total number of workers in an occupation based on a semi-annual survey of 200,000 businesses. The O*NET database divides some six-digit SOC codes into smaller sub-occupations. When this is the case, I assume that workers in the six-digit SOC code are equally distributed across the sub-occupations. For example, if a six-digit SOC occupation has 60 workers in the OES but is divided into three occupations in O*NET, I assume that the O*NET occupations each have 20 workers.	OES
Occupation Age	GSS provides data on occupations as early as 1850. GSS occupations are classified according to the Census Bureau's occupation classification system. Age is equal to the number of decades prior to the year 2000 that an occupation is present in the GSS. I convert occupations from historical census classifications to the 2000 census occupational classification system using GSS conversions. I then convert from the 2000 census classification to SOC using a conversion table available from the Census Bureau. Age is an integer value between 0 and 15. The O*NET database divides some six-digit SOC codes into smaller units. When this is the case, all subdivisions of a six-digit SOC code take on the value of their source six-digit SOC code.	GSS
Soft Science	Workers responded to the question "How important is knowledge of _____ to the performance of your current job?" for therapy and counseling, sociology and anthropology, psychology, philosophy and theology, law and government, history and archeology, art, and education and training. Soft Science is equal to the maximum value across these questions.	O*NET
Level of Competition	Survey responses to the question, "How competitive is your current job?"	O*NET

O*NET is a collection of survey data maintained by the U.S. Department of Labor (DOL) about the skills, knowledge, work context, work activities, and work styles of occupations. Career One Stop is a website that contains data on state licensing requirements maintained by the U.S. DOL. The Occupational Employment Statistics (OES) is a database of the size and incomes of workers in occupations also maintained by the U.S. DOL. The General Social Survey (GSS) is a database of survey responses from the National Opinion Research Center covering a wide variety of topics related to societal change in the United States.

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Cost Pool Classification and Judgment Performance

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ABSTRACT: Managers must understand relations among costs in order to make decisions. Prior literature assumes managers' use of cost accounting system output is affected by the information coming from the system, but not by the design of the cost system itself. This study examines how the classification of costs into cost pools affects the accuracy of individuals' understanding of relations among costs. I hypothesize that individuals will estimate relations between costs in the same cost pool first and thus more accurately than relations across different pools, because cost pools provide strong cues that meaningful relations are likely to exist within, but not across, pools. I also hypothesize that cost location (within- versus across-pool) has a greater effect on individuals' judgment accuracy when relations among costs are negative than when they are positive. Experimental results are generally consistent with these hypotheses. This experiment shows that cost pool classification choices not only affect the information managers receive, but also their interpretation and use of that information.

Keywords: *cost pools; classification; judgment; cost estimation; cost system design.*

Data Availability: *Contact the author.*

I. INTRODUCTION

A common function of accounting is the classification of individual items of data. External financial reporting and tax return preparation, for example, involve classifying many individual accounts into several lines on financial statements or tax returns. Similarly, organizations must decide how to classify individual cost accounts into cost pools. I design an

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experiment to examine how firms' cost pool classification decisions affect the judgment performance of individuals who use accounting reports.

Among other things, classification implies (dis-) similarities among the items (not) grouped together (Hopkins 1996; Sunder 1997; Maines and McDaniel 2000). For example, it is commonly assumed that costs within- (across-) cost pools are (are not) correlated with each other (e.g., Noreen 1991; Christensen and Demski 1995; Bromwich and Hong 1999; Horngren et al. 2002). However, accounting literature provides evidence that this assumption is not always valid. Dopuch and Gupta (1994), Anderson (1995), Ittner et al. (1997), and Joshi et al. (2001) document both positive and negative correlations among costs classified into different pools.

Further, there is evidence that managers do not fully understand the effects of across-pool correlations. Joshi et al.'s (2001) interviews with steel firm executives revealed that their underestimation of environmental regulatory costs "hidden" in other cost pools likely affected decisions such as plant closures, performance evaluations, and investments in pollution-reducing technologies. Thus, it appears that managers might be making suboptimal decisions due, at least in part, to misunderstandings of the behavior of costs classified separately. However, as this question was not a specific focus of Joshi et al. (2001), it is unclear whether classification in fact affected these managers' judgments and decisions.

Given this evidence of across-pool correlations among costs and the potential for managers' misunderstanding of across-pool relations among costs, it is important to identify whether cost pool classification affects managers' ability to understand the behavior of costs. Prior literature on cost system design has examined the accuracy of product costing information *provided* by different cost system pooling choices, but has largely ignored how pooling affects the way managers *use* pooled information to understand costs and the relations among costs (e.g., Christensen and Demski 1995, 1997; Bromwich and Hong 1999). To address this gap, this study addresses how cost pool classification affects managers' understanding of cost behavior and corresponding prediction of future costs.

I examine a setting in which individuals receive reports about both cost pool totals and the individual cost accounts in each pool. Individuals perform a budgeting task that requires them to predict a target cost based on their implicit estimates of the target cost's relation with various predictor costs. The predictors are located either in the same cost pool as the target cost or in another pool. To accurately predict the target cost, participants must estimate both within-pool and across-pool relations of varying strengths; that is, they must estimate the appropriate weight to put on predictor costs. Consistent with evidence of both positive and negative correlations among costs, I also vary the sign of the relations.

Drawing on research in accounting and psychology (Brehmer 1974; Sniezek 1986; Broniarczyk and Alba 1994; Luft and Shields 2001), I predict that classification will affect judgment performance by directing individuals' attention toward within-pool relations and away from across-pool relations. I expect individuals to allocate attention first toward estimating within-pool relations and subsequently toward estimating across-pool relations. This attention allocation will cause participants to estimate within-pool relations more accurately than across-pool relations due to cognitive fatigue. Consistent with prior psychology research, I predict that negative relations are estimated less accurately than positive relations. I further hypothesize that cost location (within- versus across-pool) has a greater effect on individuals' judgment accuracy when relations among costs are negative than when they are positive.

The results generally are consistent with my predictions. Participants estimate within-pool relations more accurately than across-pool relations. Self-reported data on prediction strategies suggest this effect occurs because classification affects individuals' allocation of attention, and the allocation of attention, in turn, affects the accuracy of their estimate of the relation between predictors and the target (that is, their weighting of predictors). Finally, the accuracy of cost prediction is an interactive function of the location and the sign of the relation, such that the target cost is especially difficult to predict when strong negative relations are in separate pools.

This research makes several contributions. First, I provide evidence that cost pool classification choices can affect managers' understanding of the correlations among costs classified into pools. This finding is an important addition to the existing literature on cost system design, which generally assumes that managers will use information in an unbiased and rational manner (e.g., Christensen and Demski 1995). On the contrary, I find that cost pooling can affect how managers examine and use the pooled data. Previous studies have considered the effects of cost pool choices on the accuracy of product cost estimates and the loss of information due to aggregation of pooled costs (e.g., Datar and Gupta 1994; Christensen and Demski 1995, 1997). But this study provides evidence that cost pool choices have a more subtle but potentially far-reaching effect—they interfere with managers' judgments about the relations among costs even when details about the costs are not lost due to aggregation. Further, those effects depend on the sign and strength of the relations within the cost data.

Second, I extend evidence for the process by which classification of costs into pools affects managers' estimation of relations from accounting data. Consistent with Luft and Shields (2001), I find that accounting classification directs users' attention toward certain relations and away from others. Additionally, I find evidence consistent with users adopting a satisficing approach to examine accounting data. In the experiment, optimal predictions are obtained by ignoring classification altogether and using predictor costs in both pools. However, users appear to ignore cross-pool relations when within-pool relations provide a reasonable prediction. This approach can cause users to overlook important relations that cross accounting classifications. To the extent that accounting choices direct attention away from important relations, cost system design choices can prevent users from examining and, thus, accurately estimating those relations.

I also contribute to accounting practice by providing evidence that classification choices can have greater effects on the judgment performance of managers the more they rely on accounting to support their subjective judgments about relations among costs. The advent of ERP systems, for example, has increased some managers' trust in and reliance on their accounting systems. Managers at one firm with a new ERP system had greater trust in their system's output because, as one manager put it, they now have greater trust that "the data is the data" (Anonymous 2006, 36). At the same time, implementation of ERP systems often leads to reorganizing business processes to match those assumed by the ERP modules (Lee and Lee 2000; Sumner 2000; Robey et al. 2002). Thus, managers are more trusting in their accounting systems even as their systems' content and business processes change in ways they do not fully understand. This study suggests that managers' ability to understand their costs could decline with the arrival of ERP systems.

Of course, reliance on cost pool classifications as a guide for estimating cost behavior is not always detrimental. Cost pool classifications can be useful, and managers do not always have the required data to determine whether they are. Also, managers are faced with constraints, such as time pressure, and cannot always make optimal judgments. Thus, these results should not be taken to imply that reliance on cost pool classifications is never appropriate.[1]

Section II details prior literature on classification and the development of my hypothesis, Section III describes the design of my research, Section IV presents the results of my research, and Section V concludes.

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[1] I thank an anonymous reviewer for this point.

II. HYPOTHESIS DEVELOPMENT

Managers make decisions about spending and investment based, in part, upon their beliefs about the effects of expenditures in one area of the firm on costs or revenues in another. For example, consider managers who are implementing a quality-improvement program designed to reduce internal failure costs such as spoilage. These managers must understand how expenditures on quality-related activities (such as training, testing, supervision, and inspection) affect spoilage costs. That is, they must estimate the relation between levels of spending on these activities and spoilage costs, and then predict the level of spoilage costs based on the level of spending in these other areas. Because each of these activities can affect spoilage differently, managers must understand each activity's relation with spoilage. These relations can vary in strength and sign, as increases in quality-related activities can either reduce the spoilage that occurs (negative correlation) or increase the quality problems identified prior to products leaving the plant and thus recorded as spoilage rather than external failures (positive correlation). Managers often use accounting reports to improve their subjective understanding of causes of organizational performance (McKinnon and Bruns 1992). This study seeks to determine whether cost pools in those reports affect managers' judgments and predictions.

Classification of Accounting Information

Theoretical research in accounting has considered how interactions between organizations' cost functions and the classification of those costs affect the cost allocation errors reported by various cost allocation systems (Noreen 1991; Datar and Gupta 1994; Christensen and Demski 1995, 1997; Bromwich and Hong 1999). Such research, however, has examined how accounting systems *provide* information rather than how managers *use* that information. Empirical research on classification has focused primarily on the choice of cost drivers, examining the validity of claims for the existence of various important drivers of cost other than production volume (e.g., Foster and Gupta 1990; Anderson 1995; Banker et al. 1995; Ittner et al. 1997). To my knowledge, no prior study has addressed how the classification of costs into pools affects individuals' judgment performance about individual costs.

Several experimental studies consider the effects of format or classification on judgment in other accounting settings. Hopkins (1996) finds that financial analysts' predictions of stock price depends upon whether mandatorily redeemable preferred securities are classified as debt versus equity on the balance sheet. Luft and Shields (2001) find that managers expect current-period or lagged effects of expenditures based on whether the expenditures were classified as expenses or investments. Moreover, managers predict the lagged effect of the expenditures more accurately when the expenditures are classified as investments than when they are classified as expenses. Lipe and Salterio (2002) find that multiple balanced scorecard measures either above or below targets have a greater effect on managers' evaluations than those measures when classified together than when classified separately. Collectively, these studies provide some evidence that classification affects judgment. However, none of these studies addresses the judgment effects of estimating relations from information classified together or separately, such as into cost pools.

Beliefs about Cost Relations and Accuracy of Estimation

Discussions of classification in accounting textbooks and literature typically focus on correlations among costs as the basis for the classification of costs into pools (e.g., Christensen and Demski 1995; Kaplan and Cooper 1998; Horngren et al. 2002). The literature states or strongly implies that because costs in the same pool move with a single allocation base, they move in concert with each other. Furthermore, because each pool's costs are "distinct and homogeneous" (Kaplan and Cooper 1998, 86), an apparent implication is that costs that are not highly correlated would not be classified into the same pool, but rather into different pools. Thus, without evidence to the contrary, users of accounting reports are likely to believe that costs within the same pool (across-pools) are strongly positively (not) correlated.[2]

There are several ways in which these beliefs can be incorrect. As noted above, research provides evidence that costs classified into different pools are sometimes correlated with each other (Dopuch and Gupta 1994; Anderson 1995; Ittner et al. 1997; Joshi et al. 2001). In addition, it is possible that costs within-pools are uncorrelated with each other. Individuals are unlikely to expect this, especially in multiple-pool classification systems. Thus, individuals are likely to expect positive correlations among all costs within a pool, even though costs within-pools could be uncorrelated.

Preexisting beliefs about relations in data can affect how individuals allocate their attention to the various potential relations therein (Brehmer 1974; Broniarczyk and Alba 1994; Luft and Shields 2001). Research in accounting and psychology has documented the impact of individuals' beliefs on how they examine data and form judgments in a variety of task settings, including credit scoring, GPA and temperature prediction, price-quality relation judgments, and profit prediction (Muchinsky and Dudycha 1974, 1975; Sniezek 1986; Broniarczyk and Alba 1994; Luft and Shields 2001). Brehmer (1974) indicates further that individuals examine potential relations between a target and multiple predictors one relation at a time in a hierarchy, rather than examining them simultaneously. Individuals examine relations they believe to be more important earlier than those they believe to be less important (Brehmer 1974). Moreover, relations examined earlier are estimated more accurately because individuals' limited cognitive capacity leads to fatigue, reduced cognitive effort, and inconsistency (Brehmer 1974; Luft and Shields 2001). Thus, if individuals believe that costs in the same pool (across-pools) are likely to be related (unrelated), then they will tend to examine relations in the same pool earlier and more accurately than those in across-pools. This leads to the following hypotheses, stated in the alternative form:

H1: Individuals will examine within-pool cost relations before across-pool relations.

H2: Individuals will assess within-pool cost relations more accurately than across-pool cost relations.

Note that there are two potential sources of difference in accuracy of estimation of within-pool versus across-pool relations. One source is the consistency with individuals' beliefs; that is, individuals' estimates of relations that are consistent with their beliefs are more accurate than estimates of relations that are inconsistent with their beliefs (e.g., Sniezek 1986). The second source is the fatigue that likely results from examining across-pool relations later in the hierarchy. This study does not distinguish between these two possible sources of difference. Indeed, because the first source (beliefs) is hypothesized to lead to the second source (fatigue effects), it is difficult or impossible to fully distinguish between them.

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[2] Research in psychology suggests that specific training in accounting might not be the only reason individuals believe that costs in the same (a different) pool are (not) highly correlated. The grouping together of individual items under a label is investigated in the psychology literature on categorization, which has been found to constitute a fundamental part of human information processing (Murphy and Medin 1985; Markman and Gentner 2001). Individuals tend to infer that items with the same (a different) category label are similar (dissimilar) to other items with a given category label (Yamauchi and Markman 2000; Markman and Gentner 2001).

Cost Prediction Accuracy

Accuracy in cost prediction is a function of the accuracy of individuals' estimates of all possible predictor-target relations. Accurate prediction requires individuals to accurately estimate the sign and magnitude of these relations. This includes determining whether potential predictors actually have a statistically significant relation with the target. If individuals do not correctly recognize that some relations between potential predictors and the target are zero, and if they include uncorrelated costs in their prediction models, then the resulting predictions will be inaccurate. Thus, accurate cost estimation includes recognizing when, contrary to expectations, some within-pool costs are uncorrelated with the target. The following subsection develops predictions about cost accuracy as a simultaneous function of all predictor-target relations, including effects of sign and the location of the relation.

Because individuals likely allocate attention earlier to relations in the same pool than to relations across-pools and estimate those relations more accurately, the location of predictive relations (i.e., either within the same cost pool or across cost pools) will affect the accuracy of individuals' overall estimation of the relations among costs. If the predictions from H1 and H2 hold, and relations exist in the same cost pool (across cost pools), then individuals will allocate attention to the predictive relations earlier (later) and, thus, will estimate the predictive relations more (less) accurately.

H3a: Cost prediction accuracy is higher when predictive relations are in the same pool as the target than when the relations are in different cost pools.

Psychology research also indicates that the sign of relations can affect the accuracy of individuals' estimations of relations independently of attention-allocation effects. Brehmer (1974) and Sniezek (1986) find that individuals examine positive relations before negative relations; thus, negative relations are given less attention and examined with greater fatigue than positive relations, and are estimated less accurately. Accordingly, I expect individuals will examine relations among costs more accurately when costs are positively, rather than negatively, correlated.

H3b: Cost prediction accuracy is higher when the relations among costs are positive than when relations among costs are negative.

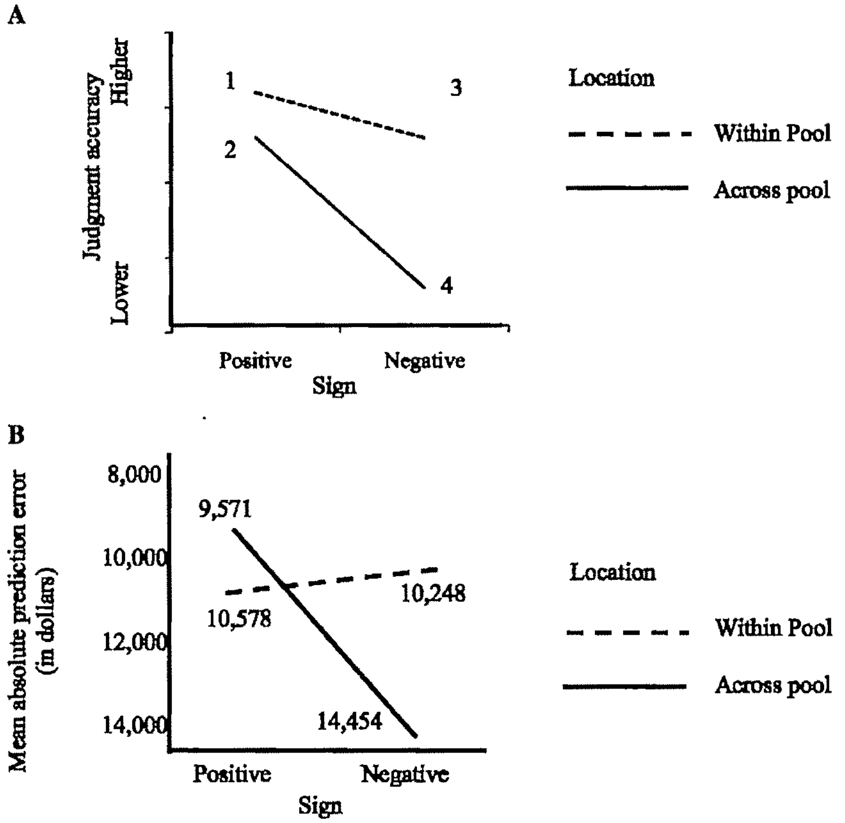
I also expect the sign and location of the predictive relation to interact. When relations among costs are *positive*, relations are relatively easy to estimate. Even though individuals will still allocate less attention to the predictive relation when it is across-pools, the relative ease of estimating positive relations mitigates the fatigue associated with later estimation of across-pool relations. Therefore, individuals will estimate the target's relation with the predictor with relatively high accuracy, even though it is across-pools. Thus, when relations among costs are positive, the effect on prediction accuracy of the location of the stronger predictor will be relatively small.

On the other hand, when relations among costs are *negative*, relations are relatively difficult to estimate. In this case, the fatigue associated with later estimation of across-pool relations exacerbates the difficulty of estimating negative relations. Thus, individuals will estimate the relation very inaccurately. When relations among costs are negative, the effect on prediction accuracy of the location of the stronger predictor will be relatively large. Figure 1, Panel A graphically presents the predicted interaction between sign and the location of the stronger predictor; I hypothesize that the interaction takes the form $(3 - 4) > (1 - 2)$:

H3c: The effect of the location of predictive relations on cost-prediction accuracy is greater when cost relations are negative than when cost relations are positive.

FIGURE 1
Graphical Presentation of H3

Panel A: Predicted Relation
Panel B: Results of H3c



Panel A of this figure presents the predicted interaction between the location of the predictor (either in the same pool as the target cost or in the other pool) and the sign of the coefficients (positive or negative) that relate the predictors to the target.

Panel B shows the results of testing H3c. Amounts refer to mean absolute error in dollars for each condition; a lower error indicates greater accuracy.

Independent Variables: Sign = the sign of relations among costs; and Location = the location of the stronger relation, either within a single cost pool or across multiple cost pools.

Dependent Variable: Judgment accuracy of participants' predictions compared to optimal predictions derived from the environmental model.

An important boundary condition on H3a and H3c should be noted. Cost prediction is the product of the coefficient on the predictor and the level of the predictor itself. Thus, a relatively small coefficient error multiplied by a relatively large predictor would result in a larger cost-prediction error than the same coefficient error multiplied by a smaller predictor. Therefore, the prediction of cost accuracy is valid only to the extent that levels of costs are similar across different pools. In this study, I control for this possibility by giving all predictors the same mean and variance. Thus, any differences in cost-prediction accuracy result from differences in the accuracy of estimating relations among costs.

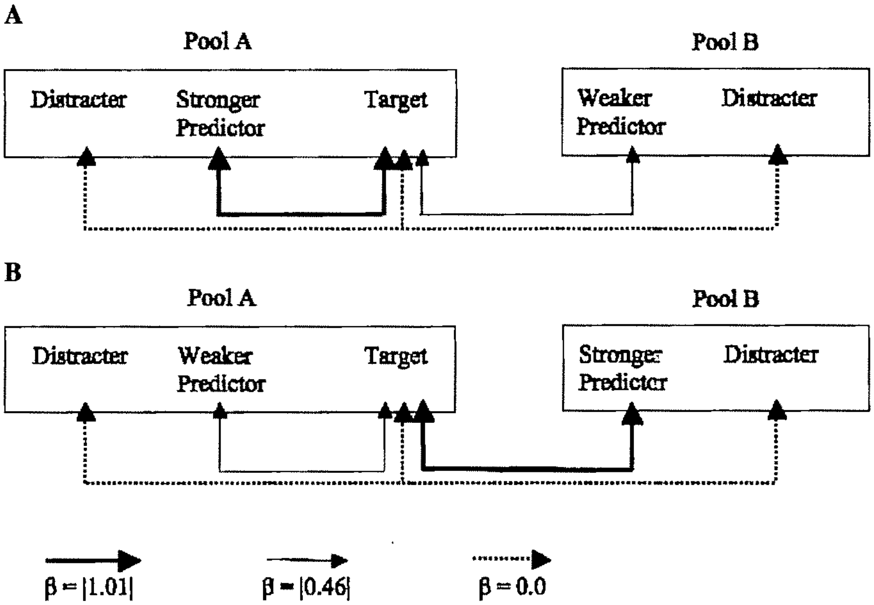
III. RESEARCH DESIGN

Procedure and Task

The experiment involves an operating budgeting task in which participants predict the amount of the next month's expected spoilage costs in each of 20 similar manufacturing plants. First, participants examined the prior month's cost report for each plant; then, based on the relations among costs they observe therein, they predicted each plant's spoilage costs for the next month. There were four costs available for participants to use as possible predictors in the prediction task. Two of the costs (the predictors) affect the amount of reported spoilage costs. One of the predictors (the "stronger predictor") has a stronger correlation with spoilage costs than does the other (the "weaker predictor"). To provide additional evidence about the accuracy of participants' estimation of relations, I include two additional costs (the "distracters") whose true correlation with spoilage is zero. The five costs—the two predictors, the two distracters, and spoilage—are each assigned to one of two pools, each containing one predictor and one distracter. The experimental materials are in Appendix A. Figure 2 depicts the classification and cost behavior conceptually: Panel A presents the condition in which the stronger predictor is within the same pool as spoilage; Panel B presents the condition in which the stronger predictor is across-pool.

FIGURE 2
Experimental Design

Panel A: Stronger Predictor is Within-Pool
Panel B: Stronger Predictor is Across-Pool



This figure conceptually depicts the design of the experimental task. "Target" describes the target cost that the individual is to predict. "Stronger," "weaker," and "distracter" describe the relations between the predictors and the target. The β coefficients specify the strength of the relations between the target and the predictors. The boxes represent classification boundaries. Note that because, in this example, all costs have similar scales, larger coefficients imply stronger correlations and more predictive power.
All differences between coefficients are statistically significant at $p < 0.05$, two-tailed.

Participants were informed that spoilage costs do not directly result from a single spending decision but rather result from, and are predictable because of, other spending decisions made during the month. Participants were given a learning dataset that provided the prior month's cost data by plant, as reported in the two cost pools (see Appendix A, Exhibit 1).

To reduce noise, I attempt to set participants' beliefs about the sign of relations by prefacing the task with the statements for the positive and negative conditions. The positive condition included the following wording:

> *Higher spending* on one (or more) of these activities could lead to *higher levels of spoilage costs* being recorded, because more care is taken to *identify and discard defective units* before they are sent to customers.[3]

The negative condition was worded similarly:

> *Higher spending* on one (or more) of these activities could lead to *lower spoilage costs* by *improving production quality.*

Participants also received a prediction dataset, which provides next month's budgeted levels of the predictor costs as well as blanks for filling in predictions of expected spoilage costs (see Appendix A, Exhibit 2). Participants were allowed to use calculators.[4] A series of follow-up questions include manipulation checks and questions about each participant's GPA in accounting and statistics courses, beliefs about the relations among costs, and reasoning for examining particular relations among costs.

Research Design

The experiment employs a 2 × 2 × 2 between-participants design. The first factor is whether the stronger predictor is within-pool or across-pool. The second factor is whether the sign of all the predictor-target relations is positive or negative. The third factor is the label of the costs. The following subsections describe these manipulations in detail.

Location of Stronger Predictive Relation and Sign

The relation between spoilage and the two predictors is $Spoilage = Constant \pm 1.01 \times Stronger \pm 0.46 \times Weaker + error$; where *Stronger* (*Weaker*) refers to the predictor with the stronger (weaker) relation with spoilage, *Constant* equals –$24,145 ($104,125) in the positive (negative) condition, and *error* refers to zero-mean noise. The constant varies between the sign conditions to ensure that the mean and range of spoilage cost levels in the learning data are similar across positive and negative conditions and similar to those of the predictors and distracters. In order for those parameters to be similar, the intercept must vary. As the focus of this study is on the estimation of coefficients, not constants, and the sign manipulation was between- rather than within-participants, this feature of the design should not affect the results. The parameters used in the experimental design are summarized in Table 1. The rows in Table 1 describe the model for each condition individually.

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[3] Increasing inspection and prevention activities often leads to an initial increase in internal failure costs (Blocher et al. 2008).

[4] One participant obviously used a statistical calculator, as he generated a very accurate model and reported its R^2 on his experimental materials. Results are not affected by the inclusion or exclusion of this participant's responses. In this task setting, the dataset was small enough that complete testing of a multiple regression model was relatively easy, and the loss of efficiency caused by including all possible predictors was minimal. The use of calculation aids will help individuals examine relations accurately and apply their decision models consistently. However, an important step in assuring accurate estimation is choosing which relations to examine. The use of a calculation aid will not necessarily help in this part of the task in practice, where the use of all possible predictors would likely result in significant losses of efficiency.

Within each condition, the means, variances, and ranges of the predictors (*inspection* and *supervisors*) of all datasets are identical. The four columns of costs are identical across experimental conditions, differing only in their placement among cost pools.[5] The only differences across conditions are the values of spoilage, which differ between the negative and positive conditions by use of a linear transformation. Further, there are no statistically significant differences for the four costs between the learning and judgment datasets, mitigating any concern about mean differences between the learning and judgment data producing nonlinear relations between spoilage and other costs.[6]

Label

For half of the participants, the costs in the same pool as spoilage are labeled "Inspection" and "Testing," and the pool itself is labeled "Quality Control Costs," while the costs in the other pool are labeled "Supervisors" and "Training," and the pool is labeled "Supervisory Costs." For the other half of the participants, the labels are reversed. This label factor is manipulated between-participants to control for any prior beliefs participants may have had about relations among costs with specific labels. ANOVAs do not reveal a significant interaction between the labels and the other independent variables (all p-values > 0.14) that affect any of the dependent variables; thus, this factor is omitted in all analyses below.

Participants

Eighty-one undergraduate business students enrolled in a cost accounting class at a large public university volunteered to participate in the research. In addition to earning a fixed amount of course credit and $5 for participating, they received incentive-based pay ranging from $1 to $10 based on their judgment accuracy. The participants' average full-time equivalent work experience was 4.8 months, and their average pay (participation plus incentive pay) totaled $10.79. Three participants' responses are eliminated because their accuracy measures are influential outliers.[7] The final sample thus comprises 78 participants.

Measurement of Dependent Variables

To measure whether classification affected participants' allocation of attention among the possible relations, I use post-experimental questions asking participants to allocate 100 points among statements of prediction strategies. The statements describe possible initial attention allocations, including (among other strategies) allocating attention first to within-pool relations, or to across-pool relations, or to all relations regardless of pool location.

To measure participants' estimates of the relations among costs, I regress each participant's predictions of spoilage costs on the prediction dataset's levels of the predictors and distracters. This regression provides each participant's implicit prediction model, comprising a constant and

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[5] To control for any effects of proximity on judgment, the predictive costs were always two columns away from spoilage.

[6] If means were different across learning and judgment data, then participants could have assumed and applied nonlinear models, which would not be adequately captured by my linear modeling technique. This would result in inaccurate measures of their judgments.

[7] I use mean squared error to identify outliers. I regress mean squared error on sign, location of the stronger predictor, and the interaction of sign and location to determine influential outliers using Cook's D. Three observations had values of Cook's D greater than (4/n), a reasonable cutoff per Fox (1991), and were thus eliminated.

TABLE 1

Experimental Design

Panel A: Spoilage Is Located in the "Quality Control Cost Pool"

Location of Stronger Relation and Sign	Quality Control Cost Pool			Supervisory Costs Cost Pool	
	Spoilage	**Inspection**	**Testing**	**Supervisors**	**Training**
Within-pool					
(1) Positive	—	1.01	0	0.46	0
(2) Negative	—	−1.01	0	−0.46	0
Across-pool					
(3) Positive	—	0.46	0	1.01	0
(4) Negative	—	−0.46	0	−1.01	0

Panel B: Spoilage Is Located in the "Supervisory Costs Cost Pool"

Location of Stronger Relation and Sign	Supervisory Costs Cost Pool			Quality Control Cost Pool	
	Spoilage	**Supervisors**	**Training**	**Inspection**	**Testing**
Within-pool					
(5) Positive	—	1.01	0	0.46	0
(6) Negative	—	−1.01	0	−0.46	0
Across-pool					
(7) Positive	—	0.46	0	1.01	0
(8) Negative	—	−0.46	0	−1.01	0

The cell entries are the coefficients relating each predictor cost to spoilage. Each row represents a between-participant cost behavior condition and can be read as the specific environmental model for that cost behavior condition, with the addition of a constant. The constant varied between positive and negative sign conditions (−\$24,145 and \$104,125, respectively). For example, for participants receiving the cost behavior described in row (1), Spoilage = −\$24,145 + 1.01 × Inspection cost + 0.46 × Supervisors cost + error. For participants receiving the cost behavior described in row (6), Spoilage = \$104,125 − 1.01 × Supervisors cost − 0.46 × Inspection cost + error.

The first between-participant factor was the location of the stronger predictor-target relation (coefficient = $|1.01|$) either in the same pool as spoilage or in the other pool; the other relation was the weaker one (coefficient = $|0.46|$). The second between-participant factor was the sign of the predictor-target relations, either positive or negative. The third between-participants factor was the label of the costs. For half of the participants, the predictors in the same pool as spoilage were labeled "Inspection," and "Testing," and the pool was labeled "Quality Control Costs," while the predictors in the other pool were labeled "Supervision" and "Training," and the pool was labeled "Supervisory Costs." For the other half of the participants, the labels were reversed.

coefficients on each of the four predictors. I then use the absolute value of the difference between the environmental coefficient and the participants' implicit coefficient as the error score for each individual relation between a predictor and the target. For the accuracy of participants' predictions of the target cost (which is a function of participants' estimates of all four predictor-target relations), I use the mean absolute error of the participants' predictions compared to the optimal predictions made by the environmental model as my measure of cost-prediction accuracy.[8]

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[8] No conclusions would be changed by the use of mean squared error of participants' predictions as compared to the environmental model. The interaction in the test of H3c is significant at $p = 0.074$ if the dependent variable were mean squared error, as compared to $p = 0.048$ as reported.

TABLE 2
Test of H1
Participants' Self-Reported Attention Allocation Strategies

	Points	Statement
a.	26.30	I looked *equally* for relationships between spoilage and other costs *regardless of the cost pool* (that is, *cost pools had no effect* on my learning strategy) because *I did not expect to learn anything about the behavior of the costs from the cost pools.*
b.	16.35	I first looked for a relationship between spoilage and the costs in the *same cost pool* because *one person or group of people has responsibility for managing the costs within the pool.*
c.	26.78	I first looked for a relationship between spoilage and the costs in the *same cost pool* because *costs within the same pool are likely to have strong relationships.*
d.	12.57	I first looked for a relationship between spoilage and the costs in the *other cost pool* because *an important cause of spoilage costs is likely to be included in a different cost pool.*
e.	14.62	I *ignored all the text descriptions and cost pools* and *only used the numerical values* to learn
	3.38	about relationships between costs.
f.	______	Other.
	100.00	Total points

This panel presents post-experimental questions. Participants were asked to allocate 100 points among the above descriptions of possible prediction strategies, allocating more points to descriptions that most closely matched their own prediction strategies. Italics were used for emphasis in the instruments as presented to research participants.
The entries in the points column (the column was blank when presented to participants) represent mean responses.

IV. RESULTS

Of the final sample of 78 participants, six failed the post-task manipulation check question that asked them to identify the cost pool to which each of the five costs (the four predictors and spoilage) belonged. I retain the responses of the six participants who failed the manipulation check; results are unchanged by the exclusion of these data. ANOVAs reveal that participants' self-reported accounting and statistics GPAs do not significantly affect any dependent variable or interact with any independent variable to affect any dependent variable (all p-values > 0.10, untabulated), so I exclude these variables from all analyses.

Hypothesis Tests

Hypothesis 1

H1 predicts that individuals will examine within-pool relations earlier than across-pool relations. To test H1, I examine how participants allocated their attention, as measured by their self-reported strategies. Table 2 presents the questions and mean points allocated to each strategy.[9] Participants were asked to allocate 100 points among six descriptions of possible estimation strategies. Items B and C are intended to capture two reasons participants could believe that costs in the same pool are strongly correlated, and the resultant strategy of examining within-pool relations first. Other items are intended to capture other strategies.

Item C received more points than did any other item, indicating that, on average, participants considered classification an important factor in their cost-prediction strategy because classification

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[9] Untabulated results indicate that points allocated to the items do not vary among the cost behavior conditions. Thus, the point allocations likely do not reflect effects of experimental conditions on prediction strategies.

TABLE 3

Test of H2

Error in Estimating Coefficients on Relations among Costs

Cost Type	n	Mean Across-Pool Coefficient Estimation Error	Mean Within-Pool Coefficient Estimation Error	Mean Difference (Across-Pool Minus Within-Pool)	p-value (one-tailed)
Predictors	78	0.49	0.37	0.12	0.009
Distracters	78	0.28	0.23	0.05	0.318

This table presents absolute error of participants' coefficient estimates. Absolute error is the absolute value of the difference between participants' coefficient estimates and the true environmental coefficients. Predictors (distracters) are potentially predictive costs that have a non-zero (zero) relation with the target cost.

likely describes cost behavior. The difference between points allocated to Item C and points allocated to each other item except Item A is statistically significant ($p = 0.917$ for Item C versus Item A, all other p-values < 0.001, one-tailed). Together, Items B and C received more points than they would have had participants allocated points equally among all items ($p < 0.01$), indicating that, on average, participants considered classification an important factor in their cost-prediction strategy. Thus, I conclude that H1 is supported, indicating that individuals use cost pools as a cue to determine which relations to examine, and examine within-pool relations earlier than across-pool relations.

Hypothesis 2

H2 predicts that within-pool relations will be estimated more accurately than across-pool relations. To test this hypothesis, I test for differences between the errors in participants' implicit coefficient estimates for within-pool and across-pool relations, as shown in Table 3. For predictors, participants estimated within-pool relations more accurately than across-pool relations ($p = 0.009$, one-tailed). For distracters, there is no difference in accuracy ($p = 0.318$, one-tailed). I thus conclude that H2 is partially supported. Together with support for H1, these results indicate that cost pools lead individuals to estimate within-pool relations more accurately than across-pool relations; that is, cost pool design affects the quality of subjective judgments about relations among costs.

Hypothesis 3

Together, H3a through H3c make predictions about participants' overall prediction accuracy. Table 4 reports an ANOVA to test these hypotheses with sign and location of stronger predictor as the fixed factors and mean absolute error of participants' predictions as the dependent variable. Panel A shows descriptive statistics for cost-prediction accuracy, and Panel B shows ANOVA results.

H3a predicts that cost-prediction accuracy is greater when predictive relations are within-pool versus across-pool. The direction of cell means is consistent with expectations, but the main effect of "Location" is not significant ($p = 0.220$). Thus, I conclude that H3a is not supported. H3b predicts that cost-prediction accuracy is greater when predictive relations are positive versus negative. The main effect of "Sign" is marginally significant at $p = 0.083$, and the pattern of cell means is in the expected direction. Thus, I conclude that H3b is supported. However, given the

TABLE 4

Test of H3a through H3c
Effects of Location and Sign of Relations on Cost Prediction Accuracy

Panel A: Descriptive Statistics

Sign	Location	Mean Absolute Error ($)	Standard Deviation ($)	n
Positive	Within-pool	10,578	4,762	21
	Across-pool	9,571	3,805	20
	Total	10,086	4,295	41
Negative	Within-pool	10,248	6,996	19
	Across-pool	14,454	6,850	18
	Total	12,294	6,925	37
Total	Within-pool	10,421	5,852	40
	Across-pool	11,884	5,925	38
	Total	11,134	5,985	78

Panel B: ANOVA

Source	df	Mean Square	F-statistic	p-value
Corrected model	3	8.96E + 7	2.754	0.048
Intercept	1	9.77E + 9	300.441	0.000
Sign	1	1.01E + 8	3.097	0.083
Location	1	4.98E + 7	1.529	0.220
Sign × Location	1	1.32E + 8	4.06	0.048
Error	74	3.25E + 7		

This table presents descriptive statistics and the results of an ANOVA to test interactive effects of sign and the location of the stronger predictor on the accuracy (measured by mean absolute error) of participants' predictions of the target cost.
Independent Variables: Sign = the sign of relations among costs; and Location = the location of the stronger predictor, either within the same cost pool as the target or across cost pools.
Dependent Variable: Mean absolute error = the mean absolute error of participants' predictions compared to optimal predictions derived from the environmental model.

presence of the interaction of "Location" and "Sign," as predicted by H3c, the tests of main effects should be interpreted cautiously.

H3c predicts that cost-prediction accuracy is an interactive function of the location of the stronger predictor and the sign of the relation among the predictors and the target, such that the effect of the stronger predictor being in a separate pool from the target cost is greater when relations are negative than when they are positive. The interaction between sign and location of the stronger predictor is significant at $p = 0.048$. I supplement the ANOVA with a contrast test using weights that approximate the relation among predicted cell means.[10] Untabulated results indicate the

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[10] Contrast weights I used are: positive, stronger predictor is within-pool: −2; negative, within-pool: −1; positive, stronger predictor is across-pool: −1; negative, across-pool: 4. These weights reflect the facts that accuracy is measured in error (higher error indicates less accuracy), and that I do not predict a particular mean difference between the negative, within-pool and the positive, across-pool conditions. Further, the difference between the cells in the negative condition (−1 versus 4) is greater than the difference between the cells in the positive condition (−2 versus −1), consistent with H3a through H3c.

TABLE 5

Participants' Average Models

Independent Variables					
Sign	**Location**	**Within-Pool Predictor[a]**	**Within-Pool Distracter[a]**	**Across-Pool Predictor[a]**	**Across-Pool Distractor[a]**
Positive	Within-pool	0.69 (<0.001) [1.01] {0.004}	0.31 (0.037) [0.00]	0.00 (0.871) [0.46] {<0.001}	0.24 (0.439) [0.00]
Positive	Across-pool	0.27 (0.003) [0.46] {0.027}	0.38 (0.753) [0.00]	0.61 (<0.001) [1.01] {<0.001}	0.15 (0.087) [0.00]
Negative	Within-pool	−0.85 (<0.001) [−1.01] {0.142}	0.02 (0.882) [0.00]	−0.06 (0.431) [−0.46] {<0.000}	0.13 (0.162) [0.00]
Negative	Across-pool	−0.05 (0.566) [−0.46] {<0.001}	0.23 (0.83) [0.00]	−0.43 (0.008) [−1.01] {0.001}	−0.69 (0.19) [0.00]

This table presents the mean coefficients estimated by participants in each condition for each of the four potentially predictive costs (two predictors and two distracters). The implicit coefficient estimates are the coefficients obtained by regressing participants' predictions of the target cost on the given levels of the predictors and distracters. The p-values indicate whether the "average" coefficient is significantly different from zero or the relevant environmental coefficient. The environmental coefficient is the true coefficient on each predictor in the learning dataset. Note that for distracters, the relevant environmental coefficient is zero, so there is only one p-value given.

Independent Variables: Sign = the sign of relations among costs; and Location = the location of the stronger relation, either within a single cost pool or across multiple cost pools.

[a] The data are shown as:
Participants' Average Coefficient
(p-value, two-tailed, test value = 0)
[Environmental Coefficient]
{p-value, two-tailed, test value = environmental coefficient, for predictors only}.

contrast model is significant (p = 0.004, one-tailed). I interpret the ANOVA and contrast test results as evidence that the effect of the stronger predictor being across-pools is greater when the relations among costs are negative than when the relations are positive. Thus, I conclude that H3c is supported.

Panel A of Table 4 and Panel B of Figure 1 present descriptive results for the positive and negative conditions. In the positive condition, mean absolute error is $9,571 ($10,578) when the stronger predictor is across-pool (within-pool). This difference is not significant (p = 0.77, one-tailed). I investigate this result further below. In the negative condition, mean absolute error is $14,454 ($10,248) when the stronger predictor is across-pool (within-pool). The difference in cell means in the negative condition is marginally significant and in the expected direction (p = 0.073, one-tailed).

To further investigate these results, I perform a further analysis of participants' estimation models. Table 5 presents "average models" for participants in each condition. Within each cost behavior condition, I present the mean of participants' coefficients for each predictor and distracter, along with tests of whether each mean coefficient differs from zero and, for predictors, each relevant environmental coefficient. Note that for distracters, the relevant environmental coefficient is zero, so only one test is needed.

The results, taken as a whole, support the hypothesis development. When relations are positive and the stronger predictor is within-pool, participants underestimate the within-pool stronger predictor ($p = 0.004$; all t-tests in this analysis are two-tailed), while also overestimating the within-pool distracter ($p = 0.037$). Participants do not significantly weight either across-pool relation ($p > 0.4$). The overweighting of the within-pool distracter suggests that participants attend to it and attempt to use it to predict costs. This probably also contributes to the underweighting of the within-pool predictor, as participants allocate attention to both within-pool costs, rather than only the one that is actually predictive of the target. The lack of weight on across-pool relations suggests participants gave little attention to these cues. These behaviors are consistent with what the theoretical development predicts.

When relations are positive and the stronger predictor is across-pools, participants weight the across-pool stronger predictor ($p < 0.001$), the across-pool distracter ($p = 0.087$), and the within-pool weaker predictor ($p = 0.003$), but not the within-pool distracter ($p = 0.753$). This also suggests that pool location matters; participants possibly assume that since the across-pool predictor is strongly predictive, the distracter within that pool is also predictive. Additionally, note that while the weaker predictor is weighted in the within-pool condition, it is not weighted in the across-pool condition, again suggesting that pool location matters.

This comparison of location conditions provides a useful insight. When the stronger predictor is within-pool, it appears that participants are satisfied with their predictions using only within-pool relations. Therefore, they use both within-pool relations while largely ignoring the across-pool relations. However, when the stronger predictor is across-pools, the weak within-pool relation is not satisfactory, and participants seek more predictive information elsewhere. These results suggest a satisficing strategy, possibly explaining the surprising result that the positive, within-pool predictions are not more accurate than the positive, across-pool predictions. If the expected within-pool relation provides what appears to be a satisfactory solution, then useful information elsewhere in other pools could be ignored completely. But if that within-pool relation is not satisfactory (that is, when the within-pool relation is weak), then individuals broaden their information search.

When relations are negative, participants appear to have weighted the stronger predictor only ($p < 0.001$ for within-pool; $p = 0.008$ for across-pool). The weaker predictor is not significantly weighted in either location condition ($p > 0.4$). Participants do not significantly underweight the strong predictor when it occurs within-pools ($p = 0.142$), but do so when it occurs across-pools ($p = 0.001$). Thus, weighting is more accurate when the stronger predictor is within-pools than when across-pools, where the relation is contrary to expectations. Additionally, it appears the smaller environmental coefficient on the weaker predictor is too difficult to estimate in the more difficult negative condition. These patterns are consistent with the hypothesis development.

Further, in the negative conditions, participants did not give any distracters statistically significant weight (all p-values > 0.16). Perhaps the negative relation makes weighting distracters too difficult to attempt. Interestingly, the lack of coefficients on distracters is more accurate than in the positive condition, wherein participants give non-zero weights to distracters that are in the same pool as the stronger predictors.

Overall, the evidence from participants' weightings is consistent with the predicted pattern of behavior. The apparent use of the satisficing strategy, although unexpected, is consistent with participants having strong expectations of within-pool relations, thereby allocating attention toward those relations. This strategy appears to have been more common in the positive than in the negative conditions, possibly due to the difficulty of assessing negative relations. Thus, while the expected pattern of cell means is not observed for the positive conditions, I conclude that the prediction of an effect of cost pool classification on judgment performance is supported.

V. CONCLUSION

Discussion

Overall, the hypothesis tests show that the pattern of participant behavior is consistent with the theoretical development. This pattern provides evidence that the location of relations within and across cost pools affects the judgment of individuals who are making predictions based on the relations among the costs. Attention is directed toward within-pool relations and away from across-pool relations, and influencing accuracy of the predictions.

Further evidence indicates that cost pool classification affects the accuracy of judgments about cost behavior by users of accounting systems because classification directs users' attention toward certain relations (namely, relations within cost pools) and away from others (relations that cross cost pools). More specifically, the accuracy of participants' cost predictions depends on an interaction between the location of strongly predictive relations and the sign of coefficients. This evidence is consistent with archival evidence in Joshi et al. (2001), who document managers' underestimation of the magnitude of across-pool relations. While the estimation errors exhibited by these managers could be caused by a number of factors, this study demonstrates that classification is a plausible cause of such errors.

More broadly, these results provide evidence on trade-offs that organizations and users face with regard to classified accounting information. Organizations' classification decisions should be informed by effects on managers' *use* of information as described in this study, as well as the system's *provision* of information, as described by prior literature. This study complements extant research on both the choice of cost drivers and the degree of aggregation of accounting information by addressing the effects of classification on judgment performance. The finding that classifying costs into different cost pools *in itself* communicates information to individuals also extends the literature both on classification in financial statements and the classification of expenditures (e.g., Hopkins 1996; Luft and Shields 2001). Moreover, this finding suggests directions future research might take in other areas of classification, such as subtotals on financial statements or earnings announcements and pro forma earnings reconciliations.

This study also suggests implications for practitioner and classroom discussions of cost system design. Such discussions of cost system design would likely benefit from an explication of the usually implicit assumption that costs in the same (a different) pool will exhibit similar (different) behavior, as well as of the effects that this assumption could have on individuals' judgment. The potential effects of this implicit assumption are likely to be especially important in refined costing systems such as activity-based costing and the German cost accounting system known as *Grenzplankostenrechnung* (e.g., Sharman 2003), which contain many cost pools or cost centers, thereby increasing the potential for classification-related errors.

Limitations

This study is subject to several limitations. First, the usual concerns apply about using student participants in experimental settings. However, the fact that even experienced managers have grossly underestimated important across-pool relations, as noted in Joshi et al. (2001), provides corroborating evidence that the effects noted here indeed exist outside the laboratory with experienced managers familiar with their firms. Furthermore, evidence from Luft and Shields (2001) demonstrates that managers' ability to learn from accounting data is influenced by the accounting itself, a finding that suggests that experience in working with pooled accounting data does not necessarily help managers learn to avoid classification-related errors.

Second, my study used a reporting format designed primarily for internal validity rather than for efficient managerial use. It is likely that great variation exists in how individual costs and cost pools are reported to individuals, and the details of these reports, to the extent that they differ from the choices made here, could have important effects on managers' judgments. In addition, I examine a setting with few potential relations and only four of many possible combinations of sign and relative strength of coefficients. Other potentially important coefficient patterns (for example, mixed signs or larger numbers of potential relations) are not considered.

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APPENDIX A

Experimental Instrument

[Note: These are the materials used for collecting data for this study for the following conditions: positive correlations, stronger predictor is within-pool, spoilage is in the supervisory costs pool.]

Background

Assume you are the controller of a manufacturing firm. One of the important parts of your job is to ***predict future costs*** as part of your firm's short-term budgeting process. One cost that you must predict for the plants in your firm is the ***monthly reported spoilage cost***—that is, the cost of products that are discarded because they do not pass inspection. This cost must be predicted because it is not an amount that plant managers directly decide to spend, but is the result of things that happen during the month.

Some (not necessarily all) of the other activities at the plant influence the amount of spoilage each month. The main activities in the plant other than direct production are **inspection, testing, supervision, and training**. *Higher spending* on one (or more) of these activities could lead to *higher levels of spoilage costs* being recorded, because more care is taken to *identify and discard defective units* before they are sent to customers. No formal statistical analysis of the relationships among these costs has been performed, so it is not yet known which, if any, of the other activity costs are good predictors of spoilage costs.

The plants in your region are all comparable in terms of workforce, equipment, and product mix, so the relationships, if any, between inspection, supervision, training, and spoilage are very similar across plants. Also, wages and input prices are similar across plants, so differences in spending levels represent differences in activity levels, not differences in prices or wages.

In order to help you predict next month's spoilage costs, your plants' cost accountants have provided the information on **Exhibit 1** from the plants' cost accounting systems. The information

EXHIBIT 1

Plants' Cost Data from Cost Accounting System

	Supervisory Costs Cost Pool				Quality Control Cost Pool		
	Details				Details		
Plant	**Supervisors**	**Training**	**Spoilage**	**Pool Total**	**Inspection**	**Testing**	**Pool Total**
1	$16,800	$14,000	$12,700	$43,500	$39,000	$32,000	$71,000
2	28,000	18,300	25,100	71,400	46,500	23,000	69,500
3	62,900	18,400	61,200	142,500	29,000	27,200	56,200
4	36,400	16,200	21,700	74,300	28,000	31,300	59,300
5	35,000	18,000	21,500	74,500	32,000	27,500	59,500
6	58,500	12,500	60,700	131,700	59,500	26,000	85,500
7	51,700	10,200	39,500	101,400	32,500	27,500	60,000
8	48,500	19,000	26,800	94,300	16,900	23,100	40,000
9	29,000	17,000	41,400	87,400	55,100	24,400	79,500
10	49,000	19,600	47,700	116,300	36,000	28,100	64,100
11	30,000	15,000	15,400	60,400	37,000	21,500	58,500
12	21,600	15,900	13,600	51,100	37,300	30,600	67,900
13	42,000	13,800	44,300	100,100	36,800	23,700	60,500
14	56,800	18,600	53,400	128,800	50,000	24,500	74,500
15	38,500	14,200	29,500	82,200	25,300	32,500	57,800
16	64,300	13,000	69,300	146,600	53,600	29,100	82,700
17	43,700	15,300	26,100	85,100	48,500	29,000	77,500
18	22,500	10,200	15,300	48,000	37,500	25,600	63,100
19	20,100	14,100	12,900	47,100	23,600	25,700	49,300
20	16,600	16,200	12,700	45,500	45,500	24,900	70,400

includes the last month's spoilage costs. Also included in Exhibit 1 are the other costs that could be helpful in predicting spoilage costs. Last month's costs are typical for your firm, and should offer a good basis for predicting next month's costs.

Note that the firm's cost accounting system reports all these costs in two ***cost pools*** for each plant:

1. The ***Quality Control pool*** includes ***inspection*** and ***testing*** costs. This pool captures the costs of ensuring that no defective products go out to customers.
2. The ***Supervision pool*** includes wages and benefits for ***supervisors*** and the costs of ***training programs***, and also ***spoilage*** costs. This pool captures the costs of preventing poor quality work by ensuring the line employees are well trained and have adequate supervision.

Costs within each pool are totaled, and only the pool total is regularly reported to most managers. The pool total is used to allocate costs to individual products and customers.

Please examine Exhibit 1 and ***learn as much as you can*** about predicting spoilage costs from the other costs provided. When you are finished, please continue on to the next page.

Cost Prediction

When you are finished examining Exhibit 1, please turn to **Exhibit 2**. Exhibit 2 contains partial budgets for the region's plants, as prepared by the plants' managers. The amounts included on

EXHIBIT 2

Plants' Partial Budgeted Cost Data

	Supervisory Costs Cost Pool			Quality Control Cost Pool	
	Details			Details	
Plant	**Supervisors**	**Training**	**Spoilage**	**Inspection**	**Testing**
A	$57,500	$14,000	______	$55,500	$26,000
B	35,000	16,300	______	23,500	32,300
C	20,500	14,200	______	34,200	22,300
D	30,000	13,000	______	35,000	27,900
E	20,500	14,800	______	47,500	24,800
F	40,000	15,000	______	39,900	30,100
G	17,500	13,200	______	22,000	30,500
H	53,000	14,500	______	21,500	34,200
I	22,000	17,500	______	37,400	27,100
J	30,900	11,100	______	33,500	27,500
K	40,000	17,900	______	20,700	23,800
L	26,900	16,800	______	19,000	30,200
M	46,100	13,900	______	59,400	31,400
N	45,200	10,200	______	18,900	29,000
O	36,000	11,000	______	64,100	29,000
P	29,600	16,800	______	49,000	31,300
Q	24,200	15,000	______	42,500	33,700
R	41,800	13,100	______	33,000	20,000
S	64,900	16,100	______	58,000	21,700
T	56,700	14,800	______	23,000	31,100

Exhibit 2 are the monthly quality control and supervision costs the plant managers have budgeted for next month.

Based on your conversations with the cost accountants and plant managers and your review of your plants' production plans, you believe the budgeted amounts on Exhibit 2 are reasonable. You also believe that the relationships between these costs and spoilage costs are likely to be the same in the next month as they were last month.

Please use the budgeted costs on Exhibit 2 to ***predict monthly spoilage costs*** for next month based on what you have learned from Exhibit 1. Feel free to use a calculator.

It is important that you try to predict costs as accurately as possible. If your predictions are inaccurate, the firm's future profitability and your performance evaluations will suffer.

Recall also that your pay is based on your predictions. Your predictions will be compared to the best predictions that can be made from the data provided. The closer your predictions to the best possible predictions, the higher your pay will be.

The plant names on Exhibit 2 are disguised. It is not a good strategy to try to "match" one plant on Exhibit 2 with one or two plants on Exhibit 1. It is a ***better strategy*** to try to ***learn relationships among the costs*** and use these relationships to predict the spoilage costs.

Please complete the 20 spoilage cost predictions now.

Once you are finished with your predictions, please turn to the next page.

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The Importance of Audit Profession Development in Emerging Market Countries

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ABSTRACT: This study investigates the country-level development of the audit profession in emerging market countries and whether this development is associated with audit quality and auditor choice. I find that audit quality is higher for client companies located in countries with a more developed audit profession, after controlling for rule of law and investor protection. Specifically, Big 4 client companies' total and abnormal accruals are both lower, and earnings are more conservative in countries with stronger Audit Profession Development (APD). However, these results hold only for companies audited by a Big 4 auditor. Results also indicate that stronger APD is associated with a greater likelihood that a client company hires a Big 4 auditor. My findings contribute to the literature that explores differences in audit quality and determinants of auditor choice, the literature that explores cross-country differences in audit professions, and research on the characteristics and effectiveness of audit institutions in emerging market economies.

Keywords: *audit profession; auditor choice; audit quality; developing countries; emerging markets; international accounting.*

Data Availability: *Data are publicly available.*

I. INTRODUCTION

The objective of this study is to investigate the country-level development of the audit profession in emerging market countries and whether this development is associated with audit quality and auditor choice. Analysis of the audit profession in these countries shows wide variation in the adoption of basic audit profession rules and regulations. I aggregate a number of these basic audit profession characteristics for a sample of emerging market countries and investigate whether audit profession development (APD) in a country is associated with audit quality and auditor choice. Given that the audit profession in many emerging market countries lacks even basic audit rules and regulations, it is important to investigate whether the implementation of

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such audit profession characteristics affects audit quality and auditor choice in these markets. Moreover, an investigation of the audit profession specifically in emerging market countries (as opposed to grouping them with more developed countries) is important because investors are increasingly looking to these markets to diversify their investment portfolios (Bekaert 1995; Levich 2001).[1]

Significant variation characterizes the development of the audit profession across emerging market countries, even though they comprise a set of less-developed countries. Furthermore, even though these countries are considered "emerging" (a definition that is discussed in Section III in more detail), this does not necessarily mean they lack laws meant to protect investors, as is illustrated later in the study. Therefore, it is important to investigate whether differences in audit profession development exist and, if so, whether these differences affect overall audit quality and auditor choice in these markets. If audit profession development does affect audit quality, then this contributes additional empirical evidence on the determinants of overall financial reporting quality in emerging markets. Furthermore, it is important to investigate whether there is an effect for only Big 4 auditors, only non-Big 4 auditors, or both. Results suggesting that APD affects both types of auditors would provide evidence that APD is a fundamental determinant of audit quality in these markets, regardless of which type of auditor a company hires. Conversely, if APD affects only Big 4 auditors, then this would provide additional evidence on factors that lead to differential audit quality between Big 4 and other auditors, similar to Francis and Wang (2008).[2]

What do I find? Results indicate that, after controlling for rule of law and investor protection, audit quality is higher in countries with more developed audit professions, but only for clients of Big 4 auditors. This indicates that APD in emerging market countries is an important determinant of audit quality for Big 4 auditors in these countries, but not for non-Big 4 auditors. Furthermore, results indicate that the likelihood a client company hires a Big 4 auditor is positively associated with APD. This suggests that the positive signal sent to the market through the hiring of a Big 4 auditor is stronger in countries where the audit profession provides Big 4 auditors a foundation for, and the incentives to, conduct high-quality audits.

This study contributes to the extant literature in three main ways. First, I examine the audit profession across a range of developing countries and compile a unique measure of APD in these countries. Other cross-country measures have been constructed and used in the accounting and finance literature to investigate investor decisions and company-level accounting characteristics (LaPorta et al. 1997, 1998; Leuz et al. 2003; Kaufmann et al. 2008). Researchers can use this measure to investigate the association between APD in emerging markets and other country- and company-level characteristics. It also introduces an important variable that should be considered in subsequent research that analyzes audit quality and auditor choice in a cross-country setting. Second, I contribute to the literature on audit quality in emerging markets and provide evidence that a more developed audit profession is positively associated with Big 4 audit quality. This is useful to investors and lenders looking to diversify their investment through equity or debt ownership in companies located in emerging markets, as evidence about audit quality can be an important part of such investment decisions. Third, I contribute to the literature on Big 4 auditor choice, as it is an important empirical question whether client companies consider APD in a country when making auditor hiring decisions. Overall, this analysis is useful to auditors, investors, regulators, and audit standard-setters and is consistent with research suggested by Meek and Thomas (2004) as it investigates differences in audit practices around the world.

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[1] I use the terms "emerging market countries" and "developing countries" interchangeably throughout the study.

[2] Francis and Wang (2008) show that audit quality is higher when investor protection laws in a country are stronger, but only for Big 4 auditors.

Section II presents background information on auditing in emerging market countries and develops hypotheses on the association between APD and audit quality and auditor choice. Section III presents the sample, measurement of APD, and descriptive statistics. Section IV describes the research design, main analyses, and sensitivity tests. Section V concludes.

II. BACKGROUND AND HYPOTHESES DEVELOPMENT

Auditing is important to well-functioning equity and debt markets through its use in contracts that reduce companies' agency costs (Watts and Zimmerman 1986). This is likely to be especially true for companies in markets that are in a development stage or do not have strong legal and financial institutions in place that help to reduce agency conflicts. Similarly, in countries where audit institutions are weak, accounting numbers supplied by companies could be viewed as less reliable and relevant by investors, lenders, and other stakeholders. This suggests that a stronger audit profession can serve to improve the quality of financial information in emerging markets through an infrastructure that supports high-quality auditing.

William Parrett, former CEO of Deloitte, Touche, Tohmatsu, said the following about global audit quality and audit standard-setting:

> While the global auditing networks need to focus on continuous quality improvement, worldwide consistency [in audit quality] will remain elusive unless regulators and standard-setters are equally committed to achieving a greater degree of uniformity in the professional environments, including the regulatory regimes, in which auditors work. The varying environments create enormous challenges to the audit function, including the differing accounting and auditing standards, the quality of regulation and degree of oversight and enforcement, and auditor qualifications. (Deloitte, Touche, Tohmatsu 2005, 1–2)

These comments indicate that sizable differences currently exist across audit profession environments worldwide and highlight the importance of and need for more development of the audit profession in many countries. Parrett's comments also suggest that auditors can improve overall audit quality worldwide only if countries' audit regulators and standard-setters are committed to high-quality audit professions within their countries. This indicates the importance of country-level audit institutions, in addition to auditor-level characteristics, for high-quality auditing worldwide. These characteristics are likely to be especially important in emerging market countries that are only beginning to develop and implement basic audit rules and standards.

Research suggests that Big 4 auditors provide audits that are of higher quality compared to smaller auditors (DeAngelo 1981; Lennox 1999). However, much of this research compares Big 4 to non-Big 4 auditors in relatively developed countries. Furthermore, the literature offers little evidence on the impact that different audit profession rules, regulation, and enforcement have on audit quality given relatively homogenous audit professions across developed, compared to emerging market, countries. This study contributes to this literature by investigating whether basic audit profession regulation affects audit quality and auditor choice in less-developed, emerging economies for both Big 4 and non-Big 4 auditors.

The reader should note that recent research challenges the findings in prior literature that Big 4 auditors conduct higher quality audits compared to non-Big 4 auditors. Specifically, Lawrence et al. (2011) provide evidence that these previous results could be due to client-specific characteristics, such as firm size, that lead to a selection bias in the analyses. This, they argue, may be leading to an erroneous inference that Big 4 auditors conduct higher quality audits. They conclude by stating that while their study does not conclusively resolve this issue, it does provide suggestive evidence that results in prior literature need to be reconsidered. However, I note that while my study investigates differences in audit quality for both Big 4 and non-Big 4 auditors, depending on the level of APD, the possible selection bias discussed by Lawrence et al. (2011) is not likely to be of primary concern in my analyses as I am not directly comparing audit quality under Big 4 auditors to audit quality under non-Big 4 auditors. Rather, I analyze whether the variation in APD across countries affects audit quality under Big 4 auditors as well as non-Big 4 auditors, considered separately.

As illustrated in the next section, there are substantial differences in the audit profession across emerging market countries. For example, auditors are not required to undergo independent professional reviews in many of these countries. Moreover, audit implementation guidelines are often never issued in the language of the home country by an informed organization. This can lead to substantial variation in audit quality within a country if different auditors are implementing auditing standards in different ways and under different interpretations. These factors can lead to breaches of independence and varying quality of audit implementation, which potentially have a negative impact on audit quality.

Finally, emerging market economies are becoming more integrated into the global economy and have become more important to investors worldwide in recent years. The recent share of global economic output generated by emerging markets is just below 50 percent and rising (*Economist* 2008). This highlights the increasing importance emerging market economies are playing in the global business environment and signals a need for additional research that investigates variation in the audit and equity markets in these countries.

Audit Quality Hypotheses

I investigate two main research questions. The first is whether APD is associated with audit quality. Audit quality is inferred by statistical properties of clients' earnings with respect to total accruals, abnormal accruals, earnings conservatism (i.e., timely loss recognition), the likelihood a company receives a qualified audit opinion, and the likelihood a company reports small growth in earnings.

As indicated by William Parrett's comments, even large auditors are influenced by the professional environments in which they work. This indicates that Big 4 auditors are less able to conduct high-quality audits if the audit profession lacks a sufficient level of development. This suggests that stronger audit profession development can positively affect audit quality for Big 4 auditors.

However, it is possible that Big 4 auditors can perform high-quality audits even in less-developed professional environments due to the international nature of these auditors and the fact that local offices and affiliates can draw on the expertise of their international networks (Francis and Wang 2008; Carson 2009). Furthermore, research indicates that Big 4 auditors possess reputational incentives that smaller auditors do not (Libby 1979; Dopuch and Simunic 1980, 1982; Shockley 1981; Simunic and Stein 1987; Francis and Wilson 1988; Palmrose 1988; Reynolds and Francis 2001; Francis 2004; Francis and Wang 2008). If the ability to conduct high-quality audits is independent of APD in a country, then these auditor-level incentives could lead Big 4 auditors to conduct high-quality audits irrespective of APD. This argument predicts a statistically insignificant association between APD and audit quality for companies that hire a Big 4 auditor.

Taken together, these contrasting predictions lead to part a of my first hypothesis, stated in null form:

> **H1a:** There is no association between audit profession development and audit quality when a company is audited by a Big 4 auditor.

Small, local auditors are influenced only by the audit profession and overall market characteristics that exist within their country. Therefore, APD could play a significant role in determining the ability of non-Big 4 auditors to conduct high-quality audits. However, if the reputational incentives that exist for Big 4 auditors are absent for small, local auditors, then APD would not affect audit quality for small, local auditors. In other words, even though stronger APD could provide the ability for small auditors to conduct audits of higher quality, the lack of reputational incentives likely inhibits them from doing so. Therefore, I state H1b in the null form:

> **H1b:** There is no association between audit profession development and audit quality when a company is audited by a non-Big 4 auditor.

Auditor Choice Hypothesis

The second main research question I investigate is whether client companies are more or less likely to hire a Big 4 auditor depending on the level of APD in a country. Given the increased focus on emerging markets as an investment opportunity (Levich 2001), companies located in these countries that wish to issue equity and debt financing possess incentives to signal that financial statements are of high quality. The hiring of a Big 4 auditor is one way a company can do this. Given research indicating that Big 4 auditors provide higher quality audits, both in the U.S. and globally (Teoh and Wong 1993; Francis et al. 1999; Francis and Wang 2008), client companies in countries with low APD may be more likely to hire a Big 4 auditor to compensate for negative investor perceptions of the ability of non-Big 4 auditors to adequately attest to company financial statements. Furthermore, as discussed above, research has provided evidence that Big 4 auditors possess incentives to protect their reputation by providing high-quality audits. If companies are concerned about signals sent to the market through the hiring of an auditor, then they are more likely to hire one with a reputation for performing high-quality audits.

Finally, Durnev and Kim (2005) provide evidence in an international setting that a company's voluntary improvement in governance (such as the hiring of a Big 4 auditor) can serve as a substitute for weak country institutions that negatively affect the private contracting process. They show that company-specific incentives are more important when country institutions are weak because a company has more to gain by adopting strong governance procedures in these settings. Fan and Wong (2005) document a related finding that companies in a sample of eight East Asian countries are more likely to hire a (then) Big 5 auditor when agency conflicts between controlling and minority shareholders are relatively high.

Taken together, the literature suggests that client companies in countries with weak APD will be able to voluntarily signal higher governance through the hiring of a Big 4 auditor. This suggests a negative association between APD and the likelihood a client company hires a Big 4 auditor.

However, the hiring of a Big 4 auditor in a country with weak APD may not be a credible signal of stronger corporate governance. Francis et al. (2003) find that Big 4 market share is higher, and Choi and Wong (2007) find that client companies are more likely to hire a Big 4 auditor, in countries with stronger legal environments, consistent with Big 4 auditors possessing greater incentives to conduct high-quality audits in countries with stronger legal enforcement. Consequently, client companies are able to send a more credible signal to the market in order to reduce information asymmetry in stronger institutional environments by hiring a Big 4 auditor. If APD works in a similar way, by increasing the incentives and/or ability of Big 4 auditors to conduct higher quality audits, then the market signal will be enhanced and, consequently, client companies will be more likely to hire a Big 4 auditor when APD is stronger.

However, predicting a positive or negative association between APD and Big 4 auditor choice relies heavily on the assumption that APD significantly affects audit quality only for Big 4 auditors, only non-Big 4 auditors, or under both but to different degrees (i.e., APD must affect the two auditor types *differently*). This is an empirical question that has not yet been addressed in the literature. Given the contrasting predictions outlined above, and the *a priori* lack of evidence on the association between APD and audit quality, I state my second hypothesis in null form:

> **H2:** There is no association between audit profession development and the likelihood a company hires a Big 4 auditor.

III. SAMPLE, AUDIT PROFESSION DEVELOPMENT, AND DESCRIPTIVE STATISTICS

Data and Sample

Similar to prior literature, my primary analyses infer audit quality from statistical properties of clients' earnings with respect to total accruals (Frankel et al. 2002), abnormal accruals (Frankel et al. 2002; Francis and Wang 2008), and earnings conservatism (Basu 1997; Ball and Shivakumar 2005; Bushman and Piotroski 2006). Appendix A provides detailed definitions and sources for all variables.

Auditor hiring and accounting data are obtained from the Disclosure Worldscope Database (DWS) for the years 2001–2005. I use the DWS database rather than either Datastream's version of Worldscope or Global Vantage for two reasons. First, the variable type for "Auditor" in Datastream is a "current item," meaning that historical information for each year is not available. Conversely, DWS provides a separate CD-ROM for each month of each year, so the auditor data are historically available. Second, Global Vantage uses a number to identify the auditor. However, this number is coded "9," which corresponds to "Other," for more than 50 percent of my sample. This makes it impossible to know the name of the auditor for much of the sample and verify if a local auditor is actually a Big 4 affiliate. Using the DWS database, I am able to specifically identify auditor names in each country and determine if they are a Big 4 auditor, a member of a Big 4 affiliate network, or a non-Big 4 auditor. Consistent with prior audit research in emerging market countries, I treat Big 4 offices located in a country and members of a Big 4 affiliate firm the same, and code these both as Big 4 audit firms (Fan and Wong 2005).[3]

Table 1, Panel A presents the country-level sample selection that forms the basis for my final sample. As outlined later, I obtain data to compile my measurement of audit profession development (*APD*) mainly from the World Bank's Reports on Standards and Codes (ROSC) and, to a lesser extent, the International Federation of Accountant's Assessments of the Auditing Regulatory Standard-Setting Framework (AARSSF) in member countries. The ROSC reports have been issued for 70 countries to which the World Bank provides lending. I delete 17 countries that do not possess a capital market.[4] Of the remaining, DWS does not provide company-level information for companies in 33 countries. I further delete five countries for which the total number of observations is below 50. This leaves 15 emerging market countries that form the basis of my sample.[5]

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[3] I identify Big 4 affiliates by looking up all affiliates for each of the Big 4 audit firms using their respective websites. Based on this, I code whether the auditor is a Big 4/Big 4 affiliate firm or a non-Big 4 firm. I thank Choi Jong-Hag and Jae Yong Shin for their assistance in identifying all Big 4 affiliate firms in South Korea.

[4] The World Bank provides loans to emerging countries of varying development levels. Therefore, it is interested in accounting and auditing even in countries that do not possess a capital market.

[5] I note that there exists no agreed-upon standard definition of an "emerging market" in either the academic literature or the popular press. However, an investigation indicates that all 15 countries in my sample are classified as either an "Advanced Emerging" or a "Secondary Emerging" market by the Financial Times and Stock Exchange Group (FTSE 2011). Furthermore, all 15 markets are part of the MSCI Emerging Markets Index. Finally, Standard & Poor's (2011), the International Financial Corporation (IFC) of the World Bank, Bushman et al. (2005), and Bhattacharya and Daouk (2002) all classify every country in my sample as an emerging market.

TABLE 1

Sample Selection

Panel A: Country-Level Sample Selection

	n
Countries for which ROSC reports are available	70
Less:	
Countries with no capital market	(17)
Countries not covered in the DWS database	(33)
Countries with total observations less than 50	(5)
Final number of countries that form the basis for company-level sample	15

Panel B: Company-Level Sample Selection

	n
Company-year observations in DWS drawn from the 15 sample countries	12,278
Less:	
Total assets missing or zero	(2,180)
Sales missing or zero	(196)
Market value of equity missing or zero	(242)
Audit opinion information missing[a]	(779)
Financial companies (SIC 6000–6999)	(1,486)
Final sample for total accruals and earnings conservatism analyses	7,395
Less:	
Observations with missing data necessary to calculate abnormal accruals	(1,963)
Final sample for abnormal accruals analyses	5,432

[a] I eliminate these firms as they may not actually have been audited.

ROSC is the World Bank's Reports on Standards and Codes. DWS is the Disclosure Worldscope database CD-ROMs.

Of all countries that have been issued a ROSC report and possess a capital market, those included in the sample comprise the vast majority of the most developed, emerging market countries in terms of their overall economies, representing 14 of the 15 largest countries in terms of gross domestic product (GDP) for which the World Bank has issued a ROSC report. Furthermore, the 2005 mean GDP for the sample countries is U.S.$313 billion, while the mean GDP for all ROSC countries that possess a capital market is U.S.$116 billion. This sample selection, based on data availability, biases *against* finding significant results, as relatively strong APD would likely affect audit quality and auditor choice even more in smaller, less-developed emerging market countries.

The time period of the study covers 2001 through 2005. This is a particularly salient period to investigate the effect of APD on audit quality and auditor choice. Johnson et al. (2000) argue that institutions in emerging markets matter most during periods of economic weakness. However, the mean (median) yearly stock returns and GDP growth in my sample countries are 35.8 percent (12.5

percent) and 4.9 percent (4.7 percent), respectively. This also likely biases against finding an association between APD and audit quality, given that I am investigating these associations during a period of overall economic growth and stability.

Table 1, Panel B summarizes the final company-level sample composition. There are 12,278 company-year observations available in DWS in the 15 emerging market sample countries. After the elimination of observations due to data limitations (detailed in Table 1, Panel B), the final sample for the total accruals and earnings conservatism analyses comprise a pooled, cross-sectional total of 7,395 company-year observations of 2,507 unique companies from the years 2001 through 2005 across 15 emerging market countries. The sample used to analyze abnormal accruals is reduced by a further 1,963 observations due to missing company-level data necessary to calculate abnormal accruals. I winsorize all variables at the 1 and 99 percent levels to mitigate the effects of outliers and possible inaccuracies in the data.

Country-Level Audit Profession Development

Data used to calculate the variable *APD* are hand-collected from the World Bank's Reports on Standards and Codes (ROSC) and the website of the International Federation of Accountants (IFAC 2011).[6] The ROSC reports are a joint venture between the World Bank and the International Monetary Fund to assess a set of core standards and codes relevant to the economic stability and financial sector development in emerging market countries (World Bank 2011). Under this program, the World Bank is responsible for assessing the accounting and auditing module of the ROSC known as the Review of Accounting and Auditing Standards and Practices (Hegarty et al. 2004). I use the ROSC reports to identify ten of my 13 total *APD* components. IFAC's reports cover the regulatory and audit standard-setting framework in member countries. I use these reports to identify the remaining three components. I rely on the ROSC reports foremost because they provide a much richer description of the audit markets in the sample countries, whereas the IFAC reports are simple questionnaires that do not provide as much detail. Furthermore, World Bank staff members are intimately involved in the writing of the ROSC reports, along with numerous stakeholders in each country. Finally, as the World Bank is responsible for lending to these countries, they possess incentives to ensure that the reports are as accurate as possible. Conversely, the IFAC reports are a self-assessment by member countries that are not verified as strongly as the ROSC reports. See Appendix B for additional details on the IFAC reports and their limitations.

I focus on basic audit rules and regulations that contribute to audit profession development. Specifically, I compile individual components of *APD* for all countries by considering the following four general aspects of the audit profession: (1) Auditor Education, (2) Auditing Standards, (3) Auditor Independence, and (4) Auditor Oversight. These four aspects are computed from the 13 individual components. Appendix B provides details on these aspects and the specific components that comprise each aspect.

I compute *APD* via the following steps. First, I classify each of the 13 components into one of the four aspects described above. Second, I take the average of the components within each of the four aspects separately. I do this so as to not overweight one aspect over another when aspects are composed of different numbers of components. This provides a separate value for each of the four aspects of the audit profession in each country. Finally, I average the four aspects within each country to obtain the final measure of *APD*. This measure ranges from its theoretical minimum of 0.0 to a maximum 1.0 for each country.[7,8]

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[6] Appendix B provides additional details on the ROSC and IFAC reports. For even more information, see Hegarty et al. (2004) for details on the Reports on the Observance of Standards and Codes and the implementation and methodological approaches used, and http://www.ifac.org/ComplianceAssessment/published.php for more detailed information on the IFAC reports.

Descriptive Statistics

Table 2, Panel A presents a detailed coding of the *APD* components, sorted by the four main aspects, the average for each of the four main aspects (except Standards, which contains only one component), and the overall sum for each country. I provide a country-level sum of the components for descriptive purposes in this table, whereas the measure of *APD* used in all analyses is computed as outlined above (i.e., ranging from 0.0 to 1.0). A detailed analysis of the 13 components shows wide variation.

Table 2, Panel B presents descriptive statistics for each country for the dependent variables and country-level institutional control variables used in the study. The mean value of *APD* over the 15 sample countries is 0.59. Colombia ranks lowest with a value of 0.06 while South Korea ranks highest at 0.94.

Variables measuring different characteristics of the countries and their equity markets are included in all analyses to control for differences in audit quality and auditor choice across countries that can be attributable to these factors.[9] I control for rule of law (*RULE_OF_LAW*) and investor protection (*INV_PROT*) environments across countries, as research shows these institutional characteristics affect audit quality and auditor choice (Choi and Wong 2007; Francis and Wang 2008). Furthermore, Leuz et al. (2003) argue that incentives to manage earnings are lower when investors are better protected against insiders' acquisition of private control benefits. Therefore, *INV_PROT* also serves to control for difference in managers' incentives to manage earnings across countries. *RULE_OF_LAW* is taken from Kaufmann et al. (2008, 7) as it covers many emerging countries that other indices do not. It measures "the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence." *INV_PROT* is the anti-director rights index taken from LaPorta et al. (1998, 1127), measuring "how strongly the legal system favors minority shareholders against managers or dominant shareholders in the corporate decision-making process, including the voting process." Given the importance of investor protection laws in prior audit literature (Francis and Wang 2008), I include investor protection as an additional control variable, even though this reduces the sample size, given that it is available for only 12 of the 15 sample countries. In all analyses, dichotomous variables are used for rule of law and investor

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[7] For robustness, I also perform a factor analysis on the four audit profession development aspects. Only one factor loads with an eigenvalue greater than 1, indicating that all four aspects are part of one overall concept of APD. All results in the study hold using this factor as the measure of *APD*.

[8] It is possible that APD is determined, in part, by a country's overall wealth and economic development. Given this possibility, I perform a robustness test by first regressing *APD* on the variables *MKT_SIZE*, *LnGDP*, *GDP_PER_CAP*, and *GDP_GROWTH* (n = 15) (see Appendix A for variable definitions). I then use the residual from this model as the new measure of *APD*. In effect, this residual is the extent of *APD* that is not explained by capital market and country size, wealth and economic growth. Results using this measure are very similar and inferences do not change.

[9] A more desirable way to do this would be to include country fixed-effects. However, given that my variable of interest, *APD*, is time-invariant, this is not possible. Consequently, the primary reason for including these variables is to control for cross-country differences that may affect audit quality and auditor choice. I do not make predictions for the signs or statistical significance on any of the country-level controls (except *RULE_OF_LAW* and *INV_PROT* which have been investigated in prior research). Furthermore, even though some of these country variables are highly correlated with one another, this is not a large concern as none is correlated with *APD* at over 0.50. This result mitigates the concern that collinearity between one or more of the country variables and *APD* is biasing the coefficients and statistical significance on *APD* in the regression analyses.

TABLE 2

Country Level Descriptive Statistics

Panel A: Descriptive Statistics for the Four Aspects of Audit Profession Development (*APD*)

	Education					Standards	Independence						Oversight				
Country	(1)	(2)	(3)	(4)	Avg	(5)	(6)	(7)	(8)	(9)	(10)	Avg	(11)	(12)	(13)	Avg	*SUM*[a]
Brazil	1	1	0	1	0.75	0.67	1	0.33	1	1	0	0.67	1	0.50	1	0.83	9.50
Chile	0	0	0	0	0	0.67	1	0	0	0	0	0.20	0	0	0	0	1.67
Colombia	0	0	1	0	0.25	0	0	0	0	0	0	0	0	0	0	0	1.00
Czech Republic	0	1	1	0	0.50	0.33	0	0.33	1	0	0	0.27	1	1.00	1	1.00	6.67
Hungary	1	1	1	0	0.75	1.00	1	0.33	0	0	1	0.47	1	0.50	1	0.83	8.83
India	0	1	1	1	0.75	0.67	1	0	0	0	0	0.20	1	0.50	1	0.83	7.17
Indonesia	1	1	1	1	1.00	0.33	1	0.33	1	1	0	0.67	1	1.00	1	1.00	10.67
Mexico	0	0	0	1	0.75	0.67	1	0	1	1	0	0.60	1	0	0	0.33	5.67
Pakistan	1	1	1	0	0.75	1.00	0	0	0	1	1	0.40	0	1.00	1	0.67	8.00
Peru	0	0	0	0	0	0.67	1	0.33	0	0	0	0.27	1	0	1	0.67	4.00
Philippines	1	1	1	1	1.00	1.00	1	1.00	0	1	1	0.80	1	0.50	1	0.83	11.50
Poland	0	1	1	1	0.75	0.67	1	0.33	0	0	0	0.27	1	1.00	1	0.83	8.0
South Africa	1	1	1	1	1.00	0.67	1	0.33	1	0	1	0.47	1	0.50	0	0.50	9.50
South Korea	0	1	1	1	0.75	1.00	1	1.00	1	1	1	1.00	1	1.00	1	1.00	12.00
Turkey	1	1	1	1	1.00	0.33	1	0	0	1	0	0.40	1	0	1	0.67	8.33
Means	0.47	0.73	0.73	0.60	0.67	0.65	0.80	0.29	0.40	0.47	0.33	0.45	0.80	0.50	0.73	0.67	7.50

(continued on next page)

TABLE 2 (continued)

Panel B: Country-Level Institutional Characteristics

Country	n	*APD*	*TOT_ ACC*	*AB_ ACC*	*BIG4* (%)	*RULE_OF_ LAW*	*INV_ PROT*	*IFRS_ DIFF*[b]	*MKT_ SIZE*	*DEBT_ SIZE*	*GDP* (U.S. $ millions)	*GDP_PER_ CAP* (U.S.$)	*GDP_ GROWTH* (%)
Brazil	749	0.73	−0.079	−0.002	0.75	0.60	3	11	0.38	0.30	690,791	3,801	4.41
Chile	352	0.22	−0.053	−0.001	0.98	2.10	5	13	1.12	0.78	85,872	5,361	4.76
Colombia	52	0.06	−0.041	–	0.76	0.00	3	20	0.18	0.24	89,439	2,058	3.11
Czech Republic	75	0.50	−0.061	0.000	0.90	1.57	–	14	0.36	0.35	62,052	6,076	3.68
Hungary	81	0.74	−0.065	–	0.88	1.70	–	13	0.36	0.41	54,274	5,356	4.68
India	1,028	0.61	−0.036	−0.001	0.37	1.07	5	8	0.59	0.34	575,004	536	7.59
Indonesia	479	0.75	−0.035	0.000	0.80	0.06	2	4	0.29	0.23	190,077	882	4.80
Mexico	315	0.48	−0.061	0.001	0.85	0.48	1	1	0.25	0.16	602,480	5,961	1.93
Pakistan	329	0.68	−0.040	−0.001	0.64	0.08	5	4	0.29	0.25	85,367	568	5.82
Peru	147	0.38	−0.065	0.000	0.64	0.23	3	1	0.34	0.21	59,960	2,239	4.60
Philippines	441	0.91	−0.065	0.001	0.84	0.35	3	10	0.41	0.35	85,336	1,050	4.64
Poland	152	0.63	−0.055	−0.000	0.76	1.48	–	12	0.26	0.28	184,052	4,818	2.99
South Africa	546	0.73	−0.054	−0.001	0.81	1.00	5	0	2.21	1.30	148,312	3,230	3.95
South Korea	2,319	0.94	−0.063	−0.001	0.70	1.62	2	6	0.66	1.00	587,711	9,418	4.55
Turkey	330	0.60	−0.061	−0.004	0.49	0.82	2	14	0.43	0.17	223,364	3,146	6.46
Means		0.59	−0.056	0.0	0.75	0.88	3.25	8.7	0.54	0.42	248,453	3,633	4.53

Panel C: Correlations between *APD* and Other Country Control Variables (n = 15)[c]

		1.	2.	3.	4.	5.	6.	7.	8.
1.	*APD*		0.13	−0.16	−0.29	0.31	0.26	−0.02	0.12
2.	*RULE_OF_LAW*	0.06		0.22	0.16	**0.58**	0.37	**0.67**	0.15
3.	*INV_PROT*	−0.13	0.29		0.09	0.38	−0.47	−0.39	0.28
4.	*IFRS_DIFF*	**−0.50**	0.44	0.19		0.07	0.05	0.02	0.23
5.	*MKT_SIZE*	0.10	0.33	**0.53**	−0.13		0.09	0.29	0.25
6.	*LnGDP*	0.32	−0.01	−0.36	−0.28	0.00		0.44	−0.22
7.	*GDP_PER_CAP*	−0.05	**0.64**	−0.41	0.22	0.15	0.11		**−0.60**
8.	*GDP_GROWTH*	0.25	0.02	0.46	0.03	0.05	0.07	−0.56	

(continued on next page)

TABLE 2 (continued)

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[a] *SUM* is the sum of the 13 individual questions that comprise Audit Profession Development in a country and is presented in this form in this table for descriptive purposes. The value of *APD* in all subsequent analyses ranges from a theoretical low of 0.0 to a high of 1.0.

[b] Data do not exist for the variable *IFRS_DIFF* for Colombia. It has been assigned a value of 20 based on literature that describes large differences between Colombian GAAP and IFRS (Vanegas 2008). Results are not altered if Colombia is dropped from the study altogether.

[c] All correlations with *INV_PROT* are based on 12 observations as data on this variable are not available for three sample countries.

In Panel A, the coding of all components is determined by answering the following questions, which are divided into four basic aspects of country's audit professions: (A) Auditor Education—(1) Are universities' accounting educational curriculum standards the same for all universities? (2) Are auditors required to perform on a professional examination before being licensed to practice as an auditor? (3) Are accountants required to gain professional experience before being licensed as an auditor? (4) Are auditors required to fulfill continuing education requirements on an annual basis? (B) Auditing Standards—(5) To what extent are the country's auditing standards consistent with International Standards on Auditing? This variable is coded 0.00 if there is low consistency, 0.33 if medium, 0.67 if high, and 1.00 if they are exactly the same except for very minor differences. (C) Auditor Independence—(6) Are auditors in the country *prohibited* from both preparing *and* auditing a client's financial statements? (7) What is the level of liability faced by auditors in the country? This variable is coded 0.00 if liability is non-existent, 0.33 if low, 0.67 if mid-level, and 1.00 if high. (8) Are company audit committees responsible for appointing listed companies' external auditors? (9) Is auditor rotation required for external auditors of listed companies? (10) Has the audit profession adopted the ethics code of the International Federation of Accountants? (D) Auditor Oversight—(11) Are auditors required to register with or be licensed by a central governing organization, either public or private? (12) What type of auditor practice reviews are mandatory within the country? This variable is coded 0.00 if none are required, 0.50 if a government body or a peer auditor conducts the review, and 1.00 if an independent, professional audit organization conducts the review. (13) Does an organization within the country consistently issue published audit implementation guidelines? Unless otherwise indicated, variables are coded 1 when the answer is "yes," and 0 otherwise. The final measure of audit profession development is calculated by first averaging the components within each of the four aspects within each country, and then taking the average of the four aspects. See Appendix B for more details on each of the questions.

In Panel B, n is the total number of company-year observations in the full sample drawn from each country. *APD* is the average of the four aspects of the audit profession (Auditor Education, Audit Standards, Auditor Independence, and Auditor Oversight for each country (see Table 2, Panel A and Appendix B for details on the components). *APD* theoretically ranges from 0.0 to 1.0. *TOT_ACC* is a company's total accruals in year *t* scaled by total assets. *AB_ACC* is a company's abnormal accruals in year *t* calculated based on the model in Kothari et al. (2005). Abnormal accruals are calculated within country-year groupings. *BIG4* is the percentage of audits in a country that are conducted by a Big 4 auditor. *RULE_OF_LAW* is a measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" Kaufmann et al. (2008, 7). *INV_PROT* is the anti-director right index from LaPorta et al. (1998). *IFRS_DIFF* is a measure of differences between a country's domestic GAAP and IFRS, taken from Bae et al. (2008). *MKT_SIZE* is a country's total market capitalization in a year as a percentage of gross domestic product. *DEBT_SIZE* is the amount of domestic credit provided to the private sector in a year as a percentage of gross domestic product. *GDP* is a country's gross domestic product (in U.S.$ millions). *GDP_PER_CAP* is a country's gross domestic product (in U.S.$) scaled by its population. *GDP_GROWTH* is a country's one-year growth in GDP. *GDP* and *GDP_PER_CAP* are presented here in raw form and are log-transformed in all subsequent analyses. The values for all variables except n, *APD*, *INV_PROT*, and *IFRS_DIFF* are the mean values across all sample years for each country. *APD*, *INV_PROT*, and *IFRS_DIFF* are time-invariant.

In Panel C, bold indicates significance at the 0.10 level, two-tailed. Pearson (Spearman) correlations are presented across the bottom (top) of the table. *APD* is audit profession development in a country (see Table 2, Panel A, and Appendix B for details on the components). *RULE_OF_LAW* is a measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" Kaufmann et al. (2008, 7). *INV_PROT* is the anti-director right index from LaPorta et al. (1998). *IFRS_DIFF* is a measure of differences between a country's domestic GAAP and IFRS, taken from Bae et al. (2008). *MKT_SIZE* is a country's total market capitalization in a year as a percentage of gross domestic product. *LnGDP* is the natural log of the country's gross domestic product (in U.S.$) in year *t*. *GDP_PER_CAP* is the country's gross domestic product (in U.S.$) scaled by its population. *GDP_GROWTH* is the country's one-year growth in Gross Domestic Product. Prior to the calculation of correlations, all variables are averaged within each country over all sample years except *APD*, *INV_PROT*, and *IFRS_DIFF*, which are time-invariant.

protection. A value of 1 (0) for *HIGH_COUN_INST* indicates a country with strong (weak) institutional characteristics in terms of its rule of law or investor protection.[10]

I also control for differences in a country's local accounting standards compared to IFRS to control for the effect that a country's local GAAP has on audit quality. The variable *IFRS_DIFF* is taken from Bae et al. (2008), who measure 21 IFRS standards and the extent to which a country's domestic GAAP is consistent with these standards. Consequently, this variable ranges from 0 (no difference from IFRS) to a maximum value of 21.[11] *MKT_SIZE* is a country's total market capitalization in a year scaled by GDP, and *DEBT_SIZE* is the amount of domestic credit provided to the private sector in a country in a year scaled by GDP. The variable *DEBT_SIZE* is included only in the earnings conservatism analysis as research shows that the size of a country's debt market is significantly associated with earnings conservatism (Ball et al. 2008). I also include *LnGDP* (the natural log of GDP in a year), *GDP_PER_CAP* (GDP scaled by population in a year), and *GDP_GROWTH* (growth in GDP over the previous year) to control for country size, wealth, and economic growth, respectively.

Table 2, Panel C presents country-level correlations (n = 15) between *APD* and the country-level control variables, including rule of law and investor protection.[12] Bold indicates significance at the 0.10 level, two-tailed. *APD* is significantly and negatively correlated only with *IFRS_DIFF* (however, the Spearman correlation is not significant). Consequently, there do not seem to be any systematic correlations between *APD* and the other country-level variables, providing evidence that *APD* is a distinct measure of the audit profession in a country separate from more general market size, wealth, economic growth, and legal environment. Given the inability to include country fixed-effects in the analyses as *APD* is a time-invariant measure, the lack of correlation between *APD* and other country-level variables provides some confidence that other unobservable country factors are not driving the results concerning *APD*.

Correlations between the 13 *APD* components (not tabled) show that, for over 90 percent of the correlations, each component is positively correlated with every other component. While the correlations are often not statistically significant, this can be expected as the number of country-level observations is very low (n = 15). Ten of the 13 individual components are significantly and positively correlated with *APD* at the 0.10 level, two-tailed.

Table 3, Panel A presents descriptive statistics on variables over the entire sample of company-level observations. The mean value of total accruals (*TOT_ACC*), defined as net income less cash flows, scaled by total assets, is −0.058. Abnormal accruals (*AB_ACC*) are calculated based on the modified Jones model in Kothari et al. (2005), which is an extension of Jones (1991) and Dechow et al. (1995). Expected accruals are calculated within country-year groupings with a minimum of ten observations in each group. Abnormal accruals are then calculated by taking the residual for

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[10] The sample of 15 countries used in this study contains wide variation in investor protection, with four countries exhibiting the highest possible level of investor protection. However, this is not the case for rule of law. To compare to prior research, I calculate the mean and median values of the Kaufmann et al. (2008) rule of law measure using the sample of 31 countries found in Leuz et al. (2003). This mean (median) value is 1.10 (1.37) for these 31 countries. In contrast, my sample contains only one country with a value above 1.0 (South Korea). Therefore, I use a value of 0.65 as the cutoff to denote low versus high rule of law countries. Low investor protection countries are those with an anti-director rights values from 0 to 2 and high investor protection countries are those with a value from 3 to 5 where the index ranges from a minimum of 0 to a maximum of 5 (LaPorta et al. 1998). Finally, inferences concerning *APD* do not change if continuous versions of the rule of law and investor protection variables are used instead of the dichotomous variables.

[11] Data do not exist for the variable *IFRS_DIFF* for Colombia. It has been assigned a value of 20 based on literature that describes large differences between Colombian GAAP and IFRS (Vanegas 2008). Results are not altered if Colombia is dropped from the study altogether.

[12] The number of observations is reduced to 12 for correlations between *INV_PROT* and all other variables due to missing data on *INV_PROT* for three sample countries.

TABLE 3

Descriptive Statistics for Variables Used in Multivariate Analyses

Panel A: Distributional Properties of Variables

Variable	n	Mean	Std. Dev.	25%	Median	75%
APD	7,395	0.732	0.198	0.613	0.729	0.937
TOT_ACC	7,395	−0.058	0.059	−0.082	−0.051	−0.025
AB_ACC	5,432	0.000	0.050	−0.029	0.001	0.028
BIG4	7,395	0.701	0.457	0	1.000	1.000
RULE_OF_LAW	7,395	0.166	0.598	−0.280	0.190	0.740
INV_PROT	7,088	3.105	1.371	2.000	3.000	5.000
IFRS_DIFF	7,395	7.737	5.556	6.000	6.000	10.000
MKT_SIZE	7,395	0.651	0.587	0.324	0.481	0.698
LnGDP	7,395	26.471	0.844	25.753	27.002	27.142
GDP_PER_CAP	7,395	8,095	1,174	6,900	8,226	9,387
GDP_GROWTH	7,395	4.927	2.216	3.667	4.729	6.379
SIZE	7,395	11.471	1.991	10.094	11.494	12.790
MB	7,395	1.589	1.932	0.477	1.022	1.926
LEV	7,395	0.120	0.134	0.019	0.082	0.175
CFO	7,395	0.091	0.094	0.041	0.089	0.143
LOSS	7,395	0.221	0.414	0	0	0
AR_INV	7,395	0.304	0.177	0.165	0.284	0.424
PPE	7,395	0.416	0.217	0.244	0.409	0.580
IFRS	7,395	0.050	0.218	0	0	0
INTL_EXCH	7,395	0.008	0.087	0	0	0

(continued on next page)

TABLE 3 (continued)

Panel B: Pearson Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
1. *APD*																			
2. *TOT_ACC*	**−0.07**																		
3. *AB_ACC*	0.00	**0.76**																	
4. *BIG4*	−0.01	**0.07**	**−0.08**																
5. *RULE_OF_LAW*	**0.17**	**−0.03**	−0.00	−0.00															
6. *INV_PROT*	**−0.48**	**0.10**	−0.00	**−0.09**	**−0.05**														
7. *IFRS_DIFF*	**−0.48**	**−0.02**	−0.01	**0.05**	**0.31**	**0.20**													
8. *MKT_SIZE*	−0.01	**0.04**	−0.00	**0.04**	**0.27**	**0.37**	**0.15**												
9. *LnGDP*	**0.41**	**−0.04**	0.00	**−0.16**	**0.31**	**−0.38**	**−0.22**	**−0.10**											
10. *GDP_PER_CAP*	**0.39**	**−0.14**	0.00	**0.15**	**0.66**	**−0.63**	0.01	**0.15**	**0.34**										
11. *GDP_GROWTH*	**−0.07**	**0.10**	0.00	**−0.18**	−0.01	**0.33**	**0.11**	**0.06**	**0.09**	**−0.36**									
12. *SIZE*	**−0.16**	0.01	**−0.16**	**0.27**	**0.13**	−0.01	**0.09**	**0.15**	**0.09**	**0.17**	**−0.06**								
13. *MB*	**−0.12**	−0.01	**−0.14**	**0.05**	**−0.05**	**0.18**	0.01	**0.12**	−0.01	**−0.14**	**0.09**	**0.32**							
14. *LEV*	**0.17**	**−0.11**	**0.09**	**−0.06**	−0.01	**−0.11**	**−0.05**	**−0.10**	**0.07**	**0.05**	**−0.02**	**−0.28**	**−0.10**						
15. *CFO*	**−0.10**	**−0.23**	**−0.60**	**0.13**	−0.01	**0.08**	0.01	**0.07**	−0.00	−0.01	**0.04**	**0.42**	**0.25**	**−0.33**					
16. *LOSS*	**0.11**	**−0.34**	**0.04**	**−0.05**	**−0.04**	**−0.08**	**−0.03**	**−0.07**	0.02	0.01	**−0.06**	**−0.36**	**−0.10**	**0.30**	**−0.52**				

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d on prior research. *SIZE* is the natural log of total assets (in 1,000s of U.S.$), *MB*
caled by book value, *LEV* is total debt scaled by total assets, *CFO* is cash flow
caled by total assets, *LOSS* is an indicator variable set equal to 1 if the company
et income in year *t*, *AR_INV* is accounts receivable plus inventories scaled by total
property plant and equipment scaled by total assets, *IFRS* equals 1 if the company
t, and *INTL_EXCH* equals 1 if a company is listed on a stock exchange outside of
[14] Finally, industry fixed effects based on companies' two-digit SIC codes and
are included as additional controls in all analyses. Standard errors are calculated
vey-West procedure (Newey and West 1987) with the maximum possible lag of
gested by Petersen (2009).[15]

el B presents Pearson correlations among all variables. Values in bold are
0.05 level using two-tailed tests. *APD* is negatively and significantly correlated
. It is not significantly associated with abnormal accruals or Big 4 auditor choice,
controlling for other characteristics that research has shown to be associated with
and Big 4 auditor choice, or before investigating the relation for Big 4 and non-
parately. VIF values are well below 10.0 in all models presented in Section IV,
lticollinearity is not a concern (Kennedy 1992).

IV. RESEARCH DESIGN AND ANALYSIS

of Audit Quality: Total and Abnormal Accruals

wo tests of audit quality (H1a and H1b), I analyze the association between *APD*
l accruals, consistent with these measures serving as proxies for audit quality in
ankel et al. 2002; Francis and Wang 2008), as follows:

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ate abnormal accruals at the industry level (with industry classification based on two-digit SIC
et al. (2004), the industry-country level (with industry classification based on one-digit SIC
ustry-country-year level (with industry classification based on one-digit SIC codes) all yield
hose in Table 5 (one-digit SIC codes are used when the number of missing observations due to
it SIC codes drastically reduces the number of sample countries as a result of requiring at least
er grouping). An alternative method of calculating abnormal accruals is that based on the linear
l in DeFond and Park (2001) and also used by Francis and Wang (2008). According to Francis
168–169), a benefit of this approach compared to a Jones-type model in a cross-country setting
tly controls for cross-country differences in accounting standards by using a firm as its own
abnormal accruals." Results using this approach are very similar to those presented in Table 5.
cent of sample companies use IFRS. This highlights the importance of controlling for cross-
s in accounting standards using the variable *IFRS_DIFF*. I thank an anonymous reviewer for

ous reviewer for suggesting the Newey-West approach. Results are unchanged if standard errors are
n level as suggested by Petersen (2009), who suggests including year fixed effects and clustering by
ber of years of data is relatively small. Further, Gow et al. (2010) argue that clustering by both firm
bust compared to clustering only by firm and including year fixed effects. However, they also state
ould exercise caution when applying any asymptotic methods in small-sample settings" and state that
tering "produces unequivocally better inferences than any of these methods even with as few as 10
al. 2010, 490). Given that my sample includes only five years of data, clustering by year is not
setting due to the asymptotic foundations of clustering.

TABLE 4
Audit Profession Development and Total Accruals
Dependent Variable = *TOT_ACC*

Variable	Pred.	Non-Big 4 (1)	Big 4 (2)	*COUN_INST = RULE_OF_LAW* Non-Big 4 (3)	*COUN_INST = RULE_OF_LAW* Big 4 (4)	*COUN_INST = INV_PROT* Non-Big 4 (5)	*COUN_INST = INV_PROT* Big 4 (6)
Test Variables							
APD	0/?	0.038***	−0.012**	0.030**	−0.021***	0.022**	−0.036***
APD * *HIGH_COUN_INST*	?			0.018	0.008	0.005	0.009***
Control Variables							
HIGH_COUN_INST	−			−0.010	0.005	−0.010	−0.016***
IFRS_DIFF	?	−0.001*	−0.001***	−0.001	−0.001***	−0.001	−0.000
MKT_SIZE	?	−0.003	0.004***	−0.002	0.004***	−0.003	0.002
LnGDP	?	−0.004**	0.003***	−0.004**	0.004***	−0.004**	0.003***
GDP_PER_CAP	?	−0.008***	−0.007***	−0.010***	−0.012***	−0.008**	−0.008***
GDP_GROWTH	?	0.001	0.001**	0.000	0.000	0.000	0.000
SIZE	+	0.003***	0.001**	0.003***	0.001***	0.003***	0.002**
MB	+	0.000	0.002***	0.000	0.002***	0.000	0.001**
LEV	−	−0.066***	−0.039***	−0.065***	−0.038***	−0.069***	−0.038***
CFO	−	−0.286***	−0.392***	−0.285***	−0.390***	−0.282***	−0.389***
LOSS	−	0.071***	−0.085***	−0.071***	−0.084***	−0.070***	−0.084***
Intercept	?	0.125***	−0.031	0.153***	−0.017	0.136***	−0.035
Chi-Square Test of *APD* Coeff. Differences		16.7***		9.6***		5.3**	
Chi-Square Test of *APD* * *HIGH_COUN_INST* Coeff. Diffs.				0.1		0.4	
n		2,212	5,183	2,212	5,183	2,164	4,924
Model p-value		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Adj. R^2		31.8%	44.9%	31.7%	45.1%	31.8%	44.8%

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*, **, *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, using two-tailed tests.

t-statistics are calculated based on Newey-West standard errors. *TOT_ACC* is the company's net income before extraordinary items less cash flows from operations, in year *t*, all scaled by total assets. *APD* is audit profession development in a country (see Table 2, Panel A, and Appendix B for details on the components used to calculate *APD*). *RULE_OF_LAW* is a measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" Kaufmann et al. (2008, 7). *INV_PROT* is the anti-director rights index from LaPorta et al. (1998). *HIGH_COUN_INST* = 1 represents high *RULE_OF_LAW* or *INV_PROT* and *HIGH_COUN_INST* = 0 represents low *RULE_OF_LAW* or *INV_PROT*. *IFRS_DIFF* is a measure of differences between a country's domestic GAAP and IFRS, taken from Bae et al. (2008). *MKT_SIZE* is a country's total market capitalization in a year as a percentage of gross domestic product. *LnGDP* is the natural log of the country's gross domestic product (in U.S.$) in year *t*. *GDP_PER_CAP* is the natural log of the country's gross domestic product (in U.S.$) scaled by its population at the end of year *t*. *GDP_GROWTH* is the country's one-year growth in gross domestic product in year *t*. *SIZE* is the natural log of the market value of equity of the company (in 1,000s of U.S.$) at the end of year *t*. *MB* is the company's market value of equity scaled by its book value of equity at the end of year *t*. *LEV* is the company's total debt scaled by total assets at the end of year *t*. *CFO* is the company's cash flows from operations, scaled by total assets, in year *t*. *LOSS* equals 1 if the company's net income in year *t* is below 0, and 0 otherwise.

$$TOT\_ACC \text{ or } AB\_ACC = \beta_0 + \beta_1 APD_j + Country\ Controls + Company\ Controls + Industry\ Indicators + Year\ Indicators + \varepsilon, \quad (1)$$

where *TOT_ACC* and *AB_ACC* are as defined previously.

Table 4, models (1) and (2) present the main results for total accruals on separate samples of non-Big 4 and Big 4 auditor client companies.[16] The coefficient on *APD* in model (1) (the non-Big 4 sample) is positive and significant. While this positive coefficient is a bit surprising and indicates that *APD* is negatively associated with audit quality under non-Big 4 auditors, it is clear that APD *does not positively* affect either the incentive or the ability of non-Big 4 auditors to provide audits of higher audit quality (as proxied by a company's level of total accruals). Conversely, *APD* is negatively and significantly ($p < 0.05$) associated with total accruals for clients of Big 4 auditors in model (2). These results provide evidence that stronger APD in a country leads to better audit quality, but only for clients of Big 4 auditors. A test of the differences of the *APD* coefficient across the two models indicates they are significantly different from each other ($F = 16.7$; $p < 0.01$).[17]

In models (3) through (6), the effect of APD on audit quality is analyzed in countries with low versus high rule of law and investor protection, as prior research shows these country-level factors are associated with audit quality (Leuz et al. 2003; Francis et al. 2011). This analysis serves to control for these factors (in addition to the models' other country controls), and also allows an analysis of whether APD affects audit quality differently across these environments.[18] The coefficient on *APD* in models (3) through (6) represents the effect of APD on audit quality in low rule of law/investor protection countries, while the interaction of *APD * HIGH_COUN_INST* represents the incremental difference in high rule of law/investor protection countries. In model (3), the positive and significant coefficient of 0.030 on *APD* is consistent with model (1) and indicates that, for companies that hire a non-Big 4 auditor in low rule of law countries, APD is not positively associated with audit quality. The negative and significant ($p < 0.001$) coefficient of –0.021 on *APD* in model (4) indicates that APD is positively associated with audit quality under Big 4 auditors in low rule of law countries. The insignificant coefficients on *APD * HIGH_COUN_INST* in models (3) and (4) indicate no incremental difference in high compared to low rule of law countries (i.e., APD does not affect audit quality *differently* in low versus high rule of law countries under either auditor type). Consequently, results support those in models (1) and (2) in both low and high rule of law countries and indicate that APD is positively associated with audit quality, but only for companies that hire a Big 4 auditor. This result is consistent with Big 4 auditors' reputational concerns driving their desire to implement high-quality audits even in low institutional environments. The Chi-square statistics indicate that the coefficients on *APD* (*APD * HIGH_COUN_INST*) are significantly (insignificantly) different across the two models. The insignificant differences between the two interaction coefficients are not surprising, given that neither coefficient is incrementally significant over *APD* in both models.

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[16] Another possible way to present this analysis is to use a pooled model with both Big 4 and non-Big 4 client companies in the same regression model. An indicator variable reflecting clients of Big 4 auditors (*BIG4*) would be included, along with *APD* and the interaction variable *BIG4 * APD*. In this model, *BIG4* represents the effect that Big 4 auditors have on audit quality when APD is extremely weak, *APD* represents this association for non-Big 4 auditors overall, and *BIG4 * APD* represents the incremental effect of APD for Big 4 auditors over non-Big 4 auditors (and the combined coefficient [*APD + BIG4 * APD*] represents the overall association for Big 4 auditors). Inferences using this type of model are the same as those presented in all analyses. Furthermore, these results indicate that audit quality under Big 4 auditors is no different from that for non-Big 4 auditors when APD is extremely weak. This result is similar to that in Francis and Wang (2008) who show that audit quality is no different for the two types of auditors when investor protection in a country is extremely weak.

[17] An analysis on a subsample of observations with income-increasing total accruals in Table 4 indicates that while *APD* is still negatively associated with income-increasing total accruals, the coefficient on *APD* is not significant at conventional levels. However, the number of firm-year observations with income-increasing total accruals is extremely small at 779 out of the total sample of 7,395. Therefore, one explanation for this lack of significance is low statistical power. The coefficient on *APD* remains negative and significant in an analysis of observations with income-decreasing total accruals.

[18] All inferences concerning *APD* are unchanged if the continuous versions of rule of law and investor protection are used in all analyses instead of the dichotomous versions (*HIGH_COUN_INST*).

Results in models (5) and (6) for countries with low versus high investor protection almost exactly mirror the results in models (3) and (4). The only difference is the positive and significant coefficient of 0.009 on *APD * HIGH_COUN_INST* in model (6), which indicates that APD affects audit quality under Big 4 auditors less in countries with strong compared to weak investor protection laws. However, an F-test (untabulated) of the combined coefficient [*APD* + *APD * HIGH_COUN_INST*] is positive and significant ($p < 0.001$), which indicates that APD is still positively associated with audit quality overall for Big 4 auditors in countries with strong investor protection.

I examine the economic significance of *APD* by multiplying the coefficient of −0.012 in model (2) by the 75th percentile value of *APD* (0.937) and subtracting the same coefficient multiplied by the 25th percentile value of *APD* (0.613). This analysis shows that, as *APD* goes from its 25th percentile to its 75th percentile value, total accruals decrease by a magnitude of 0.0042, holding all other variables constant at their mean levels. This represents a 6.8 (7.8) percent decrease in total accruals when compared to the untabulated mean (median) value of total accruals for clients of Big 4 auditors.

Table 5 presents similar analyses for abnormal accruals. Results in models (1) and (2) mirror those in the same models in Table 4 and indicate that *APD* is negatively associated with a company's level of abnormal accruals (i.e., APD is positively associated with audit quality), but only for clients of Big 4 auditors. Results in models (3) through (6) are also very similar to the models in Table 4, with three exceptions. These are the insignificant coefficients on *APD* in models (1), (3), and (5) for non-Big 4 auditors (indicating no significant association between APD and audit quality under these auditors), the insignificant coefficient on *APD * HIGH_COUN_INST* in model (6), and the insignificant F-statistic that tests for differences in the coefficients on *APD* between models (3) and (4). One possible explanation for this last finding is decreased statistical power, given the smaller sample size due to missing information on company-level variables necessary to calculate abnormal accruals. Finally, results are similar if only a subsample of observations with income-increasing abnormal accruals are analyzed separately, indicating that APD mitigates managers' ability to manage earnings upward when they possess the incentives to do so.[19]

Again, using the coefficient on *APD* in model (2) to assess economic significance, as *APD* goes from its 25th to its 75th percentile value, abnormal accruals of Big 4 client companies decrease by a magnitude of 0.0052. This magnitude reduction in abnormal accruals represents an 8.6 (9.7) percent decrease compared to the mean (median) value of total accruals for Big 4 clients.

Empirical Tests of Audit Quality—Accounting Conservatism

I now turn to the analysis of the association between APD and accounting conservatism. I use the following methodology developed by Ball and Shivakumar (2005) that analyzes the timeliness with which negative cash flows are reflected in accounting accruals compared to positive cash flows:[20]

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[19] This negative and significant association also holds for an analysis on a subsample of observations that exhibit income-decreasing abnormal accruals.

[20] There has been criticism of the use of the Basu (1997) measure of conservatism using earnings and returns in cross-country studies due to the possibility that stock prices reflect economic income differently across countries (Holthausen 2003). This is likely to be especially true in emerging markets where equities may exhibit lower liquidity and ownership of firms is more insider-oriented (Bekaert and Harvey 2003).

TABLE 5

Audit Profession Development and Abnormal Accruals
Dependent Variable = *AB_ACC*

				COUN_INST = *RULE_OF_LAW*		*COUN_INST* = *INV_PROT*	
Variable	**Pred.**	**Non-Big 4 (1)**	**Big 4 (2)**	**Non-Big 4 (3)**	**Big 4 (4)**	**Non-Big 4 (5)**	**Big 4 (6)**
Test Variables							
APD	0/?	0.012	−0.017***	−0.006	−0.023*	0.004	−0.021***
APD * *HIGH_COUN_INST*	?			0.051	0.014	0.019	0.010
Control Variables							
HIGH_COUN_INST	−			−0.042	−0.018	−0.005	−0.018**
IFRS_DIFF	?	0.000	−0.000	0.001	−0.000	0.000	−0.001***
MKT_SIZE	?	−0.003	0.004***	−0.001	0.005***	−0.006*	−0.001
LnGDP	?	−0.003*	0.006***	−0.001	0.006***	−0.003*	0.006***
GDP_PER_CAP	?	0.003**	−0.004***	−0.001	−0.003**	0.006***	0.001
GDP_GROWTH	?	0.001	0.000	0.000	0.001	0.001	0.001
SIZE	+	0.001*	0.001	0.002*	0.000	0.002*	0.000
MB	+	−0.001	0.001	−0.001	0.001	−0.001	0.001
LEV	+	−0.038***	−0.018**	−0.038***	−0.020***	−0.039***	−0.019**
CFO	−	−0.383***	−0.485***	−0.385***	−0.489***	−0.385***	−0.494***
LOSS	−	−0.041***	−0.044***	−0.041***	−0.044***	−0.041***	−0.044***
Intercept	?	0.106**	−0.056**	0.078	−0.082**	0.059	−0.117***
Chi-Square Test of *APD* Coeff. Differences		7.3***		0.5		3.1*	
Chi-Square Test of *APD* * *HIGH_COUN_INST* Coeff. Diffs				0.8		0.2	
n		1,541	3,891	1,541	3,891	1,505	3,761
Model p-value		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Adj. R^2		34.7%	53.0%	34.8%	53.3%	34.6%	54.1%

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*, ** *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, using two-tailed tests.

t-statistics are calculated based on Newey-West standard errors. *AB_ACC* is a company's abnormal accruals in year *t* calculated based on the model in Kothari et al. (2005). Abnormal accruals are calculated within country-year groupings. *APD* is audit profession development in a country (see Table 2, Panel A, and Appendix B for details on the components used to calculate *APD*). *RULE_OF_LAW* is a measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" Kaufmann et al. (2008, 7). *INV_PROT* is the anti-director rights index from LaPorta et al. (1998). *HIGH_COUN_INST* = 1 represents high *RULE_OF_LAW* or *INV_PROT* and *HIGH_COUN_INST* = 0 represents low *RULE_OF_LAW* or *INV_PROT*. *IFRS_DIFF* is a measure of differences between a country's domestic GAAP and IFRS, taken from Bae et al. (2008). *MKT_SIZE* is a country's total market capitalization in a year as a percentage of gross domestic product. *LnGDP* is the natural log of the country's gross domestic product (in U.S.$) in year *t*. *GDP_PER_CAP* is the natural log of the country's gross domestic product (in U.S.$) scaled by its population at the end of year *t*. *GDP_GROWTH* is the country's one-year growth in gross domestic product in year *t*. *SIZE* is the natural log of the market value of equity of the company (in 1,000s of U.S.$) at the end of year *t*. *MB* is the company's market value of equity scaled by its book value of equity at the end of year *t*. *LEV* is the company's total debt scaled by total assets at the end of year *t*. *CFO* is the company's cash flows from operations, scaled by total assets, in year *t*. *LOSS* equals 1 if the company's net income in year *t* is below 0, and 0 otherwise.

$$
\begin{aligned}
TOT\_ACC = {} & \beta_0 + \beta_1 APD_j + \beta_2 NEG_{it} * APD_j + \beta_3 CFO_{it} * APD_j + \beta_4 NEG_{it} * CFO_{it} * APD_j \\
& + \beta_5 NEG_{it} + \beta_6 CFO_{it} + \beta_7 NEG_{it} * CFO_{it} + Country\ Controls/Interactions \\
& + Company\ Controls/Interactions + Industry\ Indicators + Year\ Indicators + \varepsilon,
\end{aligned} \tag{2}
$$

where *NEG* equals 1 when a company's cash flows from operations in year *t* is negative, and 0 otherwise, and the coefficient of interest is β_4 on the interaction variable $NEG_{it} * CFO_{it} * APDj$. Due to space limitations and the insignificant differences for total and abnormal accruals in low versus high rule of law/investor protection countries in Tables 4 and 5, I present only an analysis after controlling for overall *RULE_OF_LAW* and *INV_PROT* as country institutional variables.[21]

I also control for the extent to which accounting across countries is more or less conservative. Ball et al. (2008) show that timely loss recognition, overall accounting timeliness, and conditional conservatism (timelier loss recognition than gain recognition) are all associated with debt market size. Therefore, I include an additional country control, *DEBT_SIZE*, measured as total domestic credit provided to the private sector scaled by GDP, in the earnings conservatism analyses to proxy for varying demands and, thus, differences in the extent to which accounting is conservative across countries. Descriptive statistics in Table 2, Panel B on this variable indicate that the demand for conservative accounting is lowest in Mexico (with a debt market of 16 percent of GDP) and highest in South Africa (130 percent of GDP).

Company-level controls (company size, market-to-book, and leverage) are also included, as research shows they are associated with accounting conservatism (Givoly et al. 2007; Roychowdhury and Watts 2007; LaFond and Roychowdhury 2008; LaFond and Watts 2008). Predictions for the company-level variables interacted with *NEG * CFO* are taken from LaFond and Roychowdhury (2008).[22] In the earnings conservatism model, accounting is deemed to be more conservative (or analogously, negative cash flows are incorporated into accruals in a more timely manner compared to positive cash flows) when the coefficient on *NEG * CFO * APD* is positive. Consequently, if higher APD results in more conservative accounting across countries, then I expect the coefficient of interest β_4 to be positive.

Table 6 presents the results after splitting the sample into non-Big 4 and Big 4 client companies, similar to previous analyses. The first two models control for a country's rule of law, while the second set of models control for investor protection. The insignificant coefficient of 0.289 on *NEG * CFO * APD* in model (1) indicates that accounting is *not* significantly more conservative as APD increases for clients of non-Big 4 auditors. Conversely, the positive and significant ($p < 0.05$) coefficient of 1.361 on *NEG * CFO * APD* in model (2) indicates that Big 4 client companies' accounting is more conservative in countries with stronger APD. Furthermore, the two coefficients across models are significantly different from each other ($\chi^2 = 10.8$; $p < 0.001$).[23] Results in models (3) and (4), after controlling for the level of investor protection in a country, mirror those in models (1) and (2). Consequently, APD is an important determinant of the level of companies' accounting conservatism in addition to both the level of rule of law and investor protection in a

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[21] If additional interaction variables are added to the models, including *NEG * CFO * HIGH_COUN_INST*, (untabulated) results are consistent with Tables 4 and 5 in that the association between APD and accounting conservatism is not significantly different in low compared to high rule of law and investor protection countries.

[22] The sample in LaFond and Roychowdhury (2008) is made up only of U.S. companies. Given that there is no extant research that provides definitive results on this for a sample of companies in emerging market countries, these predictions are provided for descriptive purposes for my emerging markets sample.

[23] The insignificant (positive and significant) coefficients on *NEG * CFO* in models (1) and (3) ((2) and (4)) are consistent with research indicating that earnings are less conservative overall for clients of non-Big 4 auditors compared to those of Big 4 auditors (Basu et al. 2001).

TABLE 6

Audit Profession Development and Accounting Conservatism
Dependent Variable = TOT_ACC

		COUN_INST = RULE_OF_LAW		COUN_INST = INV_PROT	
Variable	**Pred.**	**Non-Big 4 (1)**	**Big 4 (2)**	**Non-Big 4 (3)**	**Big 4 (4)**
Test Variables					
APD		−0.039	−0.026**	−0.034	−0.029**
NEG * APD		0.076	−0.021	0.002	−0.027
CFO * APD		0.507**	0.116	0.520**	0.111
NEG * CFO * APD	0/?	0.289	1.361**	−0.748	1.150**
Control Variables					
NEG		0.131	0.312	0.546**	0.424
CFO		2.013**	−0.230	2.311**	−0.247
NEG * CFO	+	−4.886	2.680	0.152	5.033**
HIGH_COUN_INST		−0.004	0.036***	0.009*	0.003
NEG * HIGH_COUN_INST		−0.032	0.001	−0.014	0.004
CFO * HIGH_COUN_INST		−0.032	−0.021***	−0.026	0.007
NEG * CFO * HIGH_COUN_INST	+	−0.497	−0.124	0.179*	0.092
DEBT_SIZE		0.012	0.005	0.006	0.023**
NEG * DEBT_SIZE		0.030	0.088**	0.012	0.058*
CFO * DEBT_SIZE		0.071	−0.012	0.068	−0.024
NEG * CFO * DEBT_SIZE	+	0.900	1.068**	0.456	0.548*
IFRS_DIFF		−0.001**	−0.001**	−0.002**	−0.001*
NEG * IFRS_DIFF		−0.002	−0.002	−0.004**	−0.002
CFO * IFRS_DIFF		0.004	0.000	0.006	0.001
NEG * CFO * IFRS_DIFF	?	−0.012	0.000	−0.014	−0.004
MKT_SIZE		0.005	0.004	−0.002	0.003
NEG * MKT_SIZE		−0.009	−0.018	−0.010	−0.022
CFO * MKT_SIZE		−0.050	−0.024	−0.027	−0.025
NEG * CFO * MKT_SIZE	?	0.212	−0.000	−0.072	−0.126
LnGDP		0.004	−0.000	0.002	0.000
NEG * LnGDP		0.002	−0.013	−0.012	−0.012
CFO * LnGDP		−0.088**	0.000	−0.083**	0.004
NEG * CFO * LnGDP	?	0.184	−0.223**	−0.068	−0.281***
GDP_PER_CAP		−0.002	−0.009***	0.007	−0.004
NEG * GDP_PER_CAP		−0.002	−0.006	−0.010	−0.002
CFO * GDP_PER_CAP		−0.029	−0.004	−0.045	0.013
NEG * CFO * GDP_PER_CAP	?	0.189	0.071	0.401***	0.231**
GDP_GROWTH		0.000	0.001	0.000	0.001
NEG * GDP_GROWTH		−0.001	0.006**	−0.001	0.006**
CFO * GDP_GROWTH		0.009	−0.003	0.011	0.000
NEG * CFO * GDP_GROWTH	?	−0.050*	0.037	−0.047*	0.038
SIZE		0.008***	0.007***	0.008***	0.006***
NEG * SIZE		0.005	0.003	0.002	0.001
CFO * SIZE		−0.023*	−0.024***	−0.026**	−0.028***
NEG * CFO * SIZE	−	0.006	−0.002	−0.001	0.002
MB		0.001	−0.001	0.001	−0.001
NEG * MB		−0.001	−0.007*	−0.001	−0.006

(continued on next page)

TABLE 6 (continued)

		COUN_INST = RULE_OF_LAW		*COUN_INST = INV_PROT*	
Variable	**Pred.**	**Non-Big 4 (1)**	**Big 4 (2)**	**Non-Big 4 (3)**	**Big 4 (4)**
*CFO * MB*		0.006	0.024***	0.006	0.027***
*NEG * CFO * MB*	–	–0.006	–0.067**	–0.009	–0.070**
LEV		–0.052***	–0.031**	–0.056***	–0.029*
*NEG * LEV*		–0.136***	–0.019	–0.131***	–0.019
*CFO * LEV*		–0.186	–0.507***	–0.223	–0.557***
*NEG * CFO * LEV*	+	–0.871**	0.416	–0.849**	0.474
Intercept		–0.134	–0.016	–0.190**	–0.043
Chi-Square Test of *APD* Coeff. Differences		10.8***		2.8*	
n		2,212	5,183	2,164	4,924
Model p-value		< 0.001	< 0.001	< 0.001	< 0.001
Adj. R^2		26.7%	30.5%	28.2%	30.1%

*, **, *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, using two-tailed tests.

t-statistics are calculated based on Newey-West standard errors. *TOT_ACC* is the company's net income before extraordinary items less cash flows from operations, in year *t*, all scaled by total assets. *APD* is audit profession development in a country (see Table 2, Panel A, and Appendix B for details on the components used to calculate *APD*). *RULE_OF_LAW* is a measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" Kaufmann et al. (2008, 7). *INV_PROT* is the anti-director rights index from LaPorta et al. (1998). *HIGH_COUN_INST* = 1 represents high *RULE_OF_LAW* or *INV_PROT* and *HIGH_COUN_INST* = 0 represents low *RULE_OF_LAW* or *INV_PROT*. *CFO* is the company's cash flows from operations, scaled by total assets, in year *t*. *NEG* equals 1 when a company's cash flows from operations in year *t* is negative, and 0 otherwise. *DEBT_SIZE* is the amount of domestic credit provided to the private sector in a country, scaled by GDP. *IFRS_DIFF* is a measure of differences between a country's domestic GAAP and IFRS, taken from Bae et al. (2008). *MKT_SIZE* is a country's total market capitalization in a year as a percentage of gross domestic product. *LnGDP* is the natural log of the country's gross domestic product (in U.S.$) in year *t*. *GDP_PER_CAP* is the natural log of the country's gross domestic product (in U.S.$) scaled by its population at the end of year *t*. *GDP_GROWTH* is the country's one-year growth in gross domestic product in year *t*. *SIZE* is the natural log of the market value of equity of the company (in 1,000s of U.S.$) at the end of year *t*. *MB* is the company's market value of equity scaled by its book value of equity at the end of year *t*. *LEV* is the company's total debt scaled by total assets at the end of year *t*.

country, but only for clients of Big 4 auditors.[24] Overall, this analysis is consistent with that presented in Tables 4 and 5.

The insignificant coefficients on *NEG * CFO * HIGH_COUN_INST* in this analysis are not entirely surprising, given that Ball et al. (2008) show an insignificant association between rule of law and accounting conservatism across countries.[25]

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[24] Models that include only *NEG*, *CFO*, *NEG * CFO*, and industry and year fixed effects indicate a positive and significant ($p < 0.001$) coefficient on *NEG * CFO* in all cases. This indicates that earnings conservatism overall exists in the 15 countries in the sample, consistent with prior research on earnings conservatism across countries (Bushman and Piotroski 2006).

[25] The reader should note, however, that Ball et al. (2008) include many country-level control variables. Therefore, the insignificant coefficient on rule of law in their study *may* be due to multicollinearity between country-level control variables. Furthermore, if models (2) and (4) of Table 6 omit all country-level control variables except *HIGH_COUN_INST*, untabulated results indicate that *HIGH_COUN_INST* is positive and significant at the 0.10 level in both models, consistent with Francis and Wang (2008). While this analysis does not control for other country-level variables, it avoids the possibility that multicollinearity between *HIGH_COUN_INST* and other variables is leading to the insignificant coefficients on *HIGH_COUN_INST*. Furthermore, I note that Francis and Wang (2008) do not include any country-level control variables in their earnings conservatism models.

Additional Results on Audit Quality

In untabulated tests I also investigate whether APD is associated with the likelihood a client company receives a qualified opinion, which could be considered a more direct measure of audit quality. However, as the DWS database does not identify the specific differences in the types of qualified opinions issued, it is not possible to ascertain whether a company's qualified opinion reflects information on things such as pending litigation or the possibility the client company might not exist as a going-concern, as compared to other, less important information such as accounting method changes or explanatory language. Given this limitation, I present these results as supplementary analyses to be viewed in conjunction with the previous three. All country controls in Tables 4 through 6 and company-level control variables common in prior analyses of qualified opinions are included (Dopuch et al. 1987; Carcello et al. 2000). Results are very similar to those presented in Tables 4 through 6. Specifically, *APD* is positively and significantly associated with the likelihood a company receives a qualified opinion, but only when audited by a Big 4 auditor. Furthermore, this result is robust to controlling for rule of law and investor protection, in addition to other country-level controls.

I also analyze whether APD is associated with the likelihood a firm reports a small growth in earnings over the prior year, defined as the change in net income from year $t-1$ to year t, all scaled by market value of equity at the end of year $t-1$, similar to prior literature (Burgstahler and Dichev 1997).[26] Untabulated results are consistent with those in Tables 4 through 6. Specifically, *APD* is negatively and significantly associated with the likelihood a company reports small earnings growth, but only for companies served by Big 4 auditors. This result is robust to the ratio of net income growth to market value of equity of 1, 2, 3, and 4 percent (i.e., current year net income less prior year net income, all scaled by year $t-1$ market value of equity, between 0.0 and 0.01, 0.0 and 0.02, 0.0 and 0.03, and finally, 0.0 and 0.04).

Empirical Tests of Big 4 Auditor Choice

To test the association between APD and auditor choice (H2), I use the following probit model, similar to prior research (Choi and Wong 2007; Fan and Wong 2005; Hay and Davis 2004):

$$\begin{aligned}\text{Prob}(BIG4 = 1) = \beta_0 + \beta_1 APD_j &+ Country\ Controls + Company\ Controls\\ &+ Industry\ Indicators + Year\ Indicators + \varepsilon. \end{aligned} \tag{3}$$

Table 7 presents the results of the analysis. The positive and significant ($p < 0.001$) coefficient of 0.646 on *APD* in model (1) indicates that a more-developed audit profession is associated with a higher likelihood a client company hires a Big 4 auditor, after controlling for other country- and company-level determinants of auditor choice, including rule of law. This is consistent with prior research showing that stronger country institutional characteristics are positively associated with Big 4 auditor choice (Francis et al. 2003; Choi and Wong 2007). Given the results in Tables 4 through 6 that stronger APD leads to higher quality audits under Big 4 auditors, this result is consistent with client companies sending a more positive signal about overall financial reporting quality, through the hiring of a Big 4 auditor, in countries with stronger APD. After calculating the marginal coefficient on *APD* in model (1), client companies are 9.2 percent more likely to hire a Big 4 auditor compared to the mean rate of Big 4 hiring overall (70.1

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[26] Results are also robust to scaling by total assets at the end of year $t-1$.

TABLE 7

Audit Profession Development and Auditor Choice
Dependent Variable = Prob. (*BIG4* = *1*)

		COUN_INST = RULE_OF_LAW		*COUN_INST = INV_PROT*	
Variable	**Pred.**	**(1)**	**(2)**	**(3)**	**(4)**
Test Variable					
APD	+/−	0.646***	−1.851**[a]	0.695***	−2.132***[a]
Control Variables					
HIGH_COUN_INST	+	−0.010	−0.030	0.124**	0.095*
MKT_SIZE	?	0.003	−0.006	−0.038	−0.039
LnGDP	?	−0.457***	−0.461***	−0.472***	−0.478***
GDP_PER_CAP	?	0.151***	0.169***	0.186***	0.193***
GDP_GROWTH	?	−0.040***	−0.037***	−0.039***	−0.036***
SIZE	+	0.229***	0.118***	0.224***	0.091**
MB	?	−0.010	0.067	−0.012	0.066
LEV	+	0.215*	−1.305**	0.208	−1.405**
LOSS	+	0.163***	0.021	0.168***	0.114
AR_INV	?	−0.226*	−0.892*	−0.180	−0.749
PPE	?	−0.245**	−0.825*	−0.239**	−0.812*
IFRS	+	−0.049	−1.923***	−0.171	−2.238***
INTL_EXCH	+	1.345***	1.331***	1.296***	1.284***
*APD * SIZE*	+		0.151***		0.182***
*APD * MB*	?		−0.109*		−0.107*
*APD * LEV*	+		1.942**		2.060**
*APD * LOSS*	+		0.198		0.088
*APD * AR_INV*	−		0.872		0.746
*APD * PPE*	−		0.764		0.743
*APD * IFRS*	+		2.746***		2.987***
Intercept	?	8.964***	9.752***	8.937***	11.073***
n		7,395	7,395	7,088	7,088
Model p-value		< 0.001	< 0.001	< 0.001	< 0.001
Pseudo R^2		16.0%	17.2%	16.0%	16.5%
Percent Correctly Predicted		73.3%	74.3%	73.3%	73.5%

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*, **, *** Indicate significance at the 0.10, 0.05, and 0.01 levels, respectively, using two-tailed tests.

[a] An F-test of the combined coefficients (*APD* + all variables interacted with *APD*, after standardizing all continuous variables with a mean of 0.0 and a standard deviation of 1.0) in models (2) and (4) shows that, overall, *APD* is positively associated with Big 4 auditor choice at the 0.001 level, consistent with models (1) and (3).

t-statistics are calculated based on Newey-West standard errors. *BIG4* equals 1 if the auditor is a Big 4 auditor or an affiliate of a Big 4 auditor in year *t*, and 0 otherwise. *APD* is audit profession development in a country (see Table 2, Panel A, and Appendix B for details on the components used to calculate *APD*). *RULE_OF_LAW* is a measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" Kaufmann et al. (2008, 7). *INV_PROT* is the anti-director rights index from LaPorta et al. (1998). *HIGH_COUN_INST* = 1 represents high *RULE_OF_LAW* or *INV_PROT* and *HIGH_COUN_INST* = 0 represents low *RULE_OF_LAW* or *INV_PROT*. *MKT_SIZE* is a country's total market capitalization in a year as a percentage of gross domestic product. *LnGDP* is the natural log of the country's gross domestic product (in U.S.$) in year *t*. *GDP_PER_CAP* is the natural log of the country's gross domestic product (in U.S.$) scaled by its population at the end of year *t*. *GDP_GROWTH* is the country's one-year growth in gross domestic product in year *t*. *SIZE* is the natural log of the market value of equity of the company (in 1,000s of U.S.$) at the end of year *t*. *MB* is the company's market value of equity scaled by its book value of equity at the end of year *t*. *LEV* is the company's total debt scaled by total assets at the end of year *t*. *LOSS* equals 1 if the company's net income in year *t* is below 0, and 0 otherwise. *AR_INV* is the company's accounts receivables plus inventory, all scaled by total assets at the end of year *t*. *PPE* is the company's net property, plant, and equipment scaled by total assets at the end of year *t*. *IFRS* equals 1 if the company uses International Financial Reporting Standards in year *t*, and 0 otherwise. *INTL_EXCH* equals 1 if the company is listed on a stock exchange outside its home country in year *t*, and 0 otherwise.

percent) as *APD* moves from one standard deviation below to one standard deviation above its mean value.[27]

Model (3) replaces rule of law with investor protection. Results on *APD* are almost identical. The coefficient on *HIGH_COUN_INST* (investor protection in this model) is positive and significant ($p < 0.05$) consistent with Choi and Wong (2007). This is in contrast with *HIGH_COUN_INST* in model (1), which is not significantly associated with Big 4 auditor choice. One explanation for this is the insignificant correlation between *RULE_OF_LAW* and *INV_PROT* shown in Table 2, Panel C. Consequently, these variables seem to measure distinctly different country-level characteristics that affect auditor choice differently.

I also investigate whether company managers consider company-level characteristics along with APD in determining which type of auditor to hire. This analysis is presented primarily as descriptive information, as I do not develop hypotheses concerning any of the company-level variables. To perform this analysis, I interact company-level variables with *APD*, similar to Choi and Wong (2007). The interaction variables in both models (2) and (4) indicate that larger companies (*APD* * *SIZE*), more highly-levered companies (*APD* * *LEV*) and companies that use International Financial Reporting Standards (*APD* * *IFRS*) are even more likely to hire a Big 4 auditor as APD increases, compared to smaller, less levered companies and those that use their country's domestic accounting standards. Companies with a higher market-to-book ratio (*APD* * *MB*) are less likely to hire a Big 4 auditor as APD increases. While these results are not entirely consistent with those in Choi and Wong (2007), that consistency should not necessarily be expected, given the insignificant correlations between *APD* and both *RULE_OF_LAW* and *INV_PROT* in Table 2, Panel C.

While the coefficients on *APD* in models (2) and (4) are negative and significant, these coefficients represent the association between *APD* and auditor choice when the main effects on the company-level variables *SIZE*, *MB*, *LEV*, *LOSS*, *AR_INV*, *PPE*, and *IFRS* (i.e., those that are interacted with *APD*) are all equal to 0 (Jaccard and Turrisi 2003). Given that many of these variables are never actually equal to 0, this coefficient is difficult to interpret. However, the overall effect of APD on auditor choice in this model can be obtained by adding the coefficient on *APD* together with all interaction coefficients.[28] Results (untabulated) indicate that the combined coefficient is positive and significant ($p < 0.001$), which indicates that APD overall is positively associated with the likelihood a company hires a Big 4 auditor, consistent with models (1) and (3).

Sensitivity Analyses

South Korea and India comprise 31.4 and 13.9 percent of the full sample, respectively (all other countries comprise less than 10 percent of the sample). To mitigate the concern that these countries are driving results, I delete each from the sample, one at a time. After deleting South Korea, the coefficient on *APD* in the abnormal accruals analyses for Big 4 client companies in Table 5, model

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[27] Economic significance is calculated as follows due to the use of a probit model: First, I standardize the variable *APD* so that it has a mean value of 0 and a standard deviation of 1.0. Second, the marginal coefficient on *APD* in model (1) (0.046 untabulated) is calculated per Agresti (2002, Chap. Five; i.e., the marginal coefficient is calculated at the mean value of *APD*). Consequently, this marginal coefficient represents the effect of a one-unit increase in *APD* over its mean value on the likelihood a company hires a Big 4 auditor (Agresti 2002). Given that *APD* has been standardized, the marginal coefficient of 0.046 represents the increase in likelihood that a company hires a Big 4 auditor when going from the mean value of *APD* (0) to one standard deviation above 0. Finally, ($0.046 * 2 = 0.092$ or 9.2 percent) represents this increase in likelihood of Big 4 auditor hiring when going from one standard deviation below to one standard deviation above the mean value of *APD*.

[28] Before performing the Chi-square test on the combined coefficients, all continuous variables are standardized so they have a mean of 0 and a standard deviation of 1. This is necessary so as to not over/underweight the coefficient values on any of the variables.

(4) remains negative, but shows a p-value of only 0.17, two-tailed. After deleting India, the coefficients on *NEG* * *CFO* * *APD* in Table 6, models (1) and (2) (earnings conservatism analyses) retain their signs and significance levels, however the Chi-square test of differences between these coefficients is no longer significant. Finally, the coefficient on *APD* in Table 7, model (1) for auditor choice is no longer significant (however, the combined coefficient of *APD* plus *APD* interacted with all company-level variables in model (2) remains positive and highly significant, indicating that these company-level factors are important determinants, along with APD, in companies' choice of auditor). All other results compared to those in the tables are very similar in terms of the signs of the coefficients and statistical significance.

A related issue is whether the relatively high number of observations in South Korea and India are driving the results. Given that South Korea exhibits the highest value of *APD*, deleting this country from an already relatively small sample of 15 countries removes meaningful variation in *APD*, a measure that is, by necessity, already time-invariant. A way to mitigate the concern over whether the sample sizes from South Korea and India are driving results, while still retaining these countries in the sample, is to retain a random sample of observations from each country (Daske et al. 2008). Consequently, I randomly delete 85 percent of firm-year observations from South Korea and 75 percent of firm-year observations from India. This reduction leaves the sample with 348 (7.5) and 257 (5.5) observations (percent of the total sample) from South Korea and India, respectively, and a total sample size of 4,648. Both countries now represent a percentage of the sample that is less than the mean of 7.7 percent for all other countries. Inferences and statistical conclusions are the same as those in Tables 4 through 7.

To ensure that results are robust to a sample of only "local" companies, I delete all companies that list on an international exchange and all companies that report under International Financial Reporting Standards. This reduces the sample size to 6,979 company-year observations. Results are not altered. Finally, I delete client companies audited by Arthur Andersen, given its demise in 2002. This reduces the sample size to 7,286 observations and again, results are not altered.

V. CONCLUSION

I investigate whether the development of the audit profession in emerging market countries is associated with audit quality and auditor choice. The importance of this investigation stems from the wide variation in the existence of very basic audit rules, guidelines, and regulations in these countries. Furthermore, in light of the insight by audit practitioners that global auditors are not be able to provide consistent audit quality across countries due to large differences in audit professional environments worldwide, it is important to investigate these issues empirically.

Results indicate that audit quality is higher in countries with more developed audit professions, but only for client companies audited by a Big 4 auditor, after controlling for many other country- and company-level characteristics. This provides evidence that audit profession development (APD) overall is an important determinant of audit quality for Big 4 auditors, but not for other auditors. Furthermore, results indicate that the likelihood a client company hires a Big 4 auditor is positively associated with APD. This suggests that the hiring of a Big 4 auditor is a more credible signal of higher financial reporting quality when the development level of the audit profession in a country both enables Big 4 auditors to conduct high-quality audits and provides incentives for them to do so.

This study contributes to the literature in three important ways. First, I compile a measure of the development of the audit professions across a sample of 15 emerging market countries that future researchers could consider when analyzing audit and earnings quality across countries. Second, I contribute to the literature on audit quality and provide evidence that a more-developed audit profession is positively associated with audit quality, but only for clients of Big 4 auditors.

Finally, I contribute to the auditor choice literature by providing evidence that APD is positively associated with Big 4 auditor choice in these countries.

This study is subject to some important limitations. First, the number of emerging market countries comprising the sample (15) is limited due to data restrictions, which could bias the results if these countries are systematically different in some way compared to a full sample of emerging market countries. However, the sample countries are representative of a set of relatively larger emerging markets based on population, economic development, and equity market size. This biases against finding results, as higher APD likely has an even greater impact on audit quality in even less-developed countries. Second, the source of the company-level data, the Disclosure Worldscope CD-ROM database, is biased toward the inclusion of larger companies, as the database contains companies listed on the countries' main stock exchanges. Given this bias, inferences drawn from the study may not generalize to extremely small public companies or private companies in these countries. Finally, my measure of APD is time-invariant over the sample period 2001–2005. While audit profession characteristics may have changed over this time period, data limitations prevent such an analysis. However, the relatively short sample period of five years somewhat mitigates the concern that large changes took place over the sample period.

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APPENDIX A

Variable Definitions

Variable	Definition	Source
APD	average of four aspects of a country's audit profession development. Each aspect includes individual components of Auditor Education, Audit Standards, Auditor Independence, and Auditor Oversight in a country. See Appendix B for details;	ROSC and AARSSF
TOT_ACC	company's net income less cash flows from operations, in year *t*, all scaled by total assets;	DWS
AB_ACC	company's abnormal accruals in year *t*. Abnormal accruals are calculated based on the model in Kothari et al. (2005) where abnormal accruals are calculated within country-year groupings with a minimum of ten observations in each group;	Kothari et al. (2005)
BIG4	1 if a company is audited by a Big 4 auditor or an affiliate of a Big 4 auditor, and 0 otherwise;	DWS
RULE_OF_LAW	measure "of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence";	Kaufmann et al. (2008, 7)
INV_PROT	anti-director rights index from LaPorta et al. (1998). This index measures "how strongly the legal system favors minority shareholders against managers or dominant shareholders in the corporate decision-making process, including the voting process";	LaPorta et al. (1998, 1127)
IFRS_DIFF	measure of the number of differences (0 to 21) between a country's domestic GAAP and IFRS;	Bae et al. (2008)
MKT_SIZE	country's total market capitalization (in U.S.$) in a year as a percentage of gross domestic product;	WDI
LnGDP	natural log of a country's gross domestic product (in U.S.$) in year *t*;	WDI
GDP_PER_CAP	natural log of a country's gross domestic product (in U.S.$) scaled by its population at the end of year *t*;	WDI
GDP_GROWTH	country's one-year growth in gross domestic product from year $t-1$ to year *t*;	WDI
DEBT_SIZE	amount of domestic credit provided to the private sector within a country during year *t*, scaled by GDP;	WDI
SIZE	natural log of the market value of equity of a company (in 1,000s of U.S.$) at the end of year *t*;	DWS

(continued on next page)

APPENDIX A (continued)

Variable	Definition	Source
MB	company's market value of equity scaled by its book value of equity at the end of year *t*;	DWS
LEV	company's total debt scaled by total assets at the end of year *t*;	DWS
CFO	company's cash flows from operations, scaled by total assets, in year *t*;	DWS
LOSS	1 if a company's net income in year *t* is below 0, and 0 otherwise;	DWS
AR_INV	company's accounts receivables plus inventory, all scaled by total assets at the end of year *t*;	DWS
PPE	company's net property, plant, and equipment scaled by total assets at the end of year *t*;	DWS
IFRS	1 if a company uses International Financial Reporting Standards in year *t*, and 0 otherwise;	DWS
INTL_EXCH	1 if a company is listed on a stock exchange outside its home country in year *t*, and 0 otherwise; and	DWS
NEG	1 if a company's cash flows from operations is below 0 in year *t*, and 0 otherwise.	DWS

ROSC is the World Bank's Reports on Standards and Codes. AARSSF is the International Federation of Accountants Assessments of the Auditing Regulatory Standard-Setting Framework. DWS is the Disclosure Worldscope database CD-ROMs. WDI is the World Bank's World Development Indicators database.

APPENDIX B

MEASUREMENT OF AUDIT PROFESSION DEVELOPMENT AND DESCRIPTION OF DATA SOURCES

The 13 components are coded by answering the following 13 questions (data source is in parentheses).[29]

(A) Auditor Education

1. Are universities' accounting education curriculum standards the same for all universities within a country (ROSC)?
2. Are auditors required to perform on a professional examination before being licensed to practice as an auditor (ROSC)?
3. Are accountants required to gain professional experience before being licensed as an auditor (ROSC)?
4. Are auditors required to fulfill continuing education requirements on an annual basis (ROSC)?

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[29] Unless otherwise noted, the questions are coded 1 when the answer is yes and 0 otherwise. (ROSC) after a component indicates the data was taken from the World Bank's Reports on the Observance of Standards and Codes. (AARSSF) after a component indicates the data was taken from IFAC's Assessments of the Auditing Regulatory Standard Setting Framework.

(B) Auditing Standards

5. To what extent are the country's auditing standards consistent with International Standards on Auditing? This variable is coded 0.00 if there is low consistency, 0.33 if medium, 0.67 if high, and 1.00 if they are exactly the same except for very minor differences (ROSC).

(C) Auditor Independence

6. Are auditors in the country *prohibited* from both preparing *and* auditing a client's financial statements (ROSC)?
7. What is the level of liability faced by auditors in the country? This variable is coded 0.00 if liability is non-existent, 0.33 if low, 0.67 if mid-level, and 1.00 if high (ROSC).
8. Are companies' audit committees responsible for appointing listed companies' external auditors (AARSSF)?
9. Is auditor rotation required for external auditors of listed companies (AARSSF)?
10. Has the audit profession adopted the ethics code of the International Federation of Accountants (ROSC)?

(D) Auditor Oversight

11. Are auditors required to register with or be licensed by a central governing organization, either public or private (ROSC)?
12. What type of auditor practice reviews are mandatory within the country? This variable is coded 0.00 if none are required, 0.50 if a government body or a peer auditor conducts the review, and 1.00 if an independent, professional audit organization (similar to the AICPA for example) conducts the review (AARSSF).
13. Does an organization within the country consistently issue published audit implementation guidelines (ROSC)?

World Bank's Reports on the Observance of Standards and Codes (ROSC)

The Reports on the Observance of Standards and Codes are, according to the World Bank's website, "a joint venture between the World Bank and the International Monetary Fund to assess a set of twelve internationally recognized core standards and codes relevant to the economic stability and private and financial sector development in emerging market countries" (World Bank 2011).[30] Under this program the World Bank is responsible for assessing the accounting and auditing module of the ROSC, known as the Review of Accounting and Auditing Standards and Practices. The reports provide a detailed review of each country's audit profession rules and practices. The objectives of the reviews are to "assess the *comparability* of national accounting and auditing standards with International Financial Reporting Standards (IFRS) and International Standards on Auditing (ISA), respectively, and the degree to which corporate entities *comply with* established accounting and auditing standards in the country and assist the country in *bridging the identified gaps* between its current standards and practices, and internationally recognized accounting and auditing standards" Hegarty et al. (2004, 17; emphasis in original). The reports are prepared by World Bank staff as well as representatives of partner institutions such as accounting standard-setters and financial sector regulators in the countries. An extensive diagnostic tool, which identifies the legal and institutional factors that exist in a country, are first prepared by World Bank staff in conjunction with country-level stakeholders.[31] Afterward, staff conduct a due diligence review to verify the information provided in the questionnaire and to capture primary experiences of practitioners and other facts on professional accounting and auditing practices in a country. Stakeholders then review the draft report, after which World Bank staff prepare a final report taking into account comments received from the stakeholders. The individual, country-level reports provide a rich qualitative and descriptive assessment in areas such as the country's accounting regulatory framework, aspects of the auditing profession, the training of auditors, the setting of accounting and auditing standards, and enforcement of such standards. The reports also contain an analysis of differences (if any) between the countries' auditing standards and International Standards on Auditing (ISA). Furthermore, included in each report is an assessment of financial statements taken from a sample of companies within the country that compare the quality of accounting and auditing standards actually used in practice compared to the accounting and auditing statutory requirements contained in the country's laws. The World Bank issued the earliest ROSC report in November 2001 and new reports continue to be issued. Consequently, my overall analysis corresponds with the early 2000s.[32]

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[30] The 12 standards are data dissemination, fiscal transparency, transparency in monetary and financial policies, banking supervision, securities market regulation, insurance supervision, payments and settlements, anti-money laundering, corporate governance, accounting, auditing, and insolvency and creditor rights (World Bank 2011).

International Federation of Accountants Assessments of the Auditing Regulatory Standard Setting Framework (AARSSF)

According to the IFAC website, the Assessment of the Regulatory Standard-Setting Framework "provides information about regulatory requirements and standard-setting processes in member body countries. IFAC staff has reviewed the responses and, where necessary, validated them with external knowledgeable parties. The purpose of [the] Assessment is to collect information on the roles of IFAC member bodies and other organizations (including government, regulatory or other appointed authorities) with respect to (1) Setting auditing, accounting, ethics, public sector and education standards, and (2) Regulating the accountancy profession" (IFAC 2011). The IFAC reports list a disclaimer stating that the information is provided by member countries and is for the private use of IFAC members and associates, but are made public for the general public interest and transparency of the IFAC Member Body Compliance Program.

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[31] Stakeholders include representatives from the Ministry of Finance, Ministry of Justice, securities market regulators, banking regulators, insurance companies and other non-banking financial institutions regulators, higher accounting educational institutions, professional accounting and auditing bodies, auditors, and institutional investors (Hegarty et al. 2004).

[32] As the DWS database was discontinued by Thomson Financial after July 2006, I am only able to analyze company-year observations through the year 2005.

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More Evidence of Bias in the Differential Timeliness Measure of Conditional Conservatism

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ABSTRACT: Despite the conceptual appeal and popularity of the differential timeliness (DT) measure of conditional conservatism proposed in Basu (1997), Dietrich et al. (2007) and Givoly et al. (2007) have identified considerable biases associated with that measure. We renew their call to avoid using the DT measure because it is affected unexpectedly by two empirical regularities—namely, scale is negatively related to (1) deflated mean earnings and (2) variance of stock returns. Even though these regularities are unrelated to conditional conservatism, their joint effect is substantial and pervasive. More importantly, prior findings regarding time-series and cross-sectional variation in differential timeliness are confounded by corresponding variation in these regularities.

Keywords: *conservatism; differential timeliness; losses; scaling by share price.*

Data Availability: *Data are publicly available from sources identified in the article.*

I. INTRODUCTION

The measure of conditional conservatism proposed in Basu (1997), which captures the differential timeliness (DT) with which bad and good news are reported in contemporaneous earnings, has had a substantial impact on accounting research. A large body of subsequent research has used this DT measure as a dependent or independent variable in both cross-sectional and time-series analyses (Section III provides examples). Despite the measure's

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conceptual appeal and popularity, Dietrich et al. (2007) and Givoly et al. (2007) provide considerable evidence suggesting that the DT measure is associated with a variety of substantial biases. And yet, we observe a sustained flow of research based on the DT measure, which may be partially due to: (1) the counter-arguments provided by Ball et al. (2010) in support of the DT measure, and (2) the intuitive feeling that while the estimates might be biased and noisy, cross-sectional and time-series variation in those estimates might still reflect genuine variation in conditional conservatism.

We document how two empirical regularities, related to scale, combine to cause a bias in the DT estimate of conditional conservatism that is so pervasive that the measure is rendered unreliable. Importantly, cross-sectional and time-series variation in the DT measure is affected substantially by corresponding variation in the empirical regularities. The first regularity is that scale is positively related to price-deflated earnings; we label this regularity as the *loss* effect because it is driven by the subset of firms reporting losses. The second regularity is that scale is negatively related to the variance of stock returns and is labeled the *return variance* effect. While the bias we note is anticipated by the general relation derived by Dietrich et al. (2007), it deserves separate attention because it is substantial and yet unexpected, insofar as the two regularities that create this bias are unrelated to conditional conservatism.

Our results offer two main takeaways. First, research on conditional conservatism should heed the call in Dietrich et al. (2007) and Givoly et al. (2007) to avoid the DT measure and consider other alternatives. Also, inferences from prior research, especially those based on cross-sectional and time-series variation in estimates of the DT measure, will likely need to be reevaluated. Even though the bias we document is large, pervasive, and explains a substantial amount of time-series and cross-sectional variation in estimates of the DT measure, it represents a lower bound on the total bias that might exist, as it does not consider all the sources of bias noted in Dietrich et al. (2007) and Givoly et al. (2007). As a result, future research should consider avoiding the DT measure even if solutions are devised to mitigate our bias.

Second, because the bias arises from within-sample variation in scale, our study illustrates the ever-present potential for bias due to clustering of observations drawn from different underlying populations. Because such biases are hard to foresee and detect, we reiterate the benefits of placebo tests (e.g., Choi et al. 2003), which replicate the analyses for dummy events or variables that should not exhibit predicted patterns. Observing similar results for dummy variables suggests that the original results are unreliable. In this case, we replicate the analyses with lagged earnings rather than current earnings. As last year's earnings cannot reflect news that will be revealed subsequently this year, it cannot differentially reflect the good and bad components of this year's news, and the DT estimate should therefore be zero. We find, however, that the DT estimate for lagged earnings is, on average, over 60 percent of that for current earnings.

Section II describes the two empirical regularities and how they combine to bias estimates of the DT measure. The prior literature is discussed in Section III, the sample is described in Section IV, and Section V reports results describing the impact of the two regularities. Section VI describes additional analyses, and Section VII concludes.

II. THE TWO SCALE-DRIVEN EMPIRICAL REGULARITIES AND THEIR IMPACT ON DT ESTIMATES

Before illustrating the two regularities, we review a commonly used version of the Basu (1997) regression model, described below as Equation (1). Annual earnings levels (scaled by lagged price) are regressed on annual abnormal returns, allowing for separate coefficients for good (bad) news partitions, represented by positive (negative) abnormal returns.[1] The coefficient β_1, which is the bad news slope minus that for good news, is the DT measure of conditional conservatism:

$$\frac{X_{it}}{P_{it-1}} = \alpha_0 + \alpha_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \varepsilon_{it}, \tag{1}$$

where:

X_{it} = earnings per share reported by firm i in year t;
P_{it-1} = price per share for firm i at the end of year $t-1$;
AR_{it} = stock return for firm i in year t minus equally weighted market return for year t; and
$D_{it} = 1$ if $AR_{it} < 0$, which represents bad news, and 0 otherwise.

The first scale-driven empirical regularity we consider, labeled the *loss* effect, refers to the positive relation between scale and the mean value of scale-deflated earnings per share. While we find it convenient to use share price to represent scale, similar relations exist for other measures of scale. Note that the loss effect is a general effect in the sense that it is not conditional on the news reported in this period and it should be observed in adjacent periods; i.e., relative to low-price firms, high-price firms have higher mean values of scale-deflated earnings next year, last year, two years ago, and so on. To confirm this general nature of the loss effect, we illustrate it using lagged earnings (X_{it-1}) rather than current earnings (X_{it}).

The line "X_{t-1}/P_{t-1} *(full sample)*" in Figure 1, Panel A describes how the mean value of lagged earnings scaled by price increases across the ten share price deciles, from a low of about −0.05 for the lowest price decile (decile 1) to a high of about 0.07 for the highest price decile (decile 10).[2] These values are time-series averages of cross-sectional means computed over firm-years ending in each calendar year. The line labeled "LD_{t-1}" (measured against the right vertical axis) describes the first part of the loss effect. The *fraction* of loss firms decreases from just over 40 percent for decile 1 to about 3 percent for decile 10. The second part is indicated by the line "X_{t-1}/P_{t-1} *(loss)*," which shows that the average *magnitude* of price-deflated losses, for the subset of firms reporting losses in each price decile, decreases from about 20 percent of lagged price for decile 1 to about 6 percent of lagged price for decile 10.

Whereas price-deflated losses are larger for low-price shares, the line "X_{t-1}/P_{t-1} *(profit)*" in Panel A of Figure 1 indicates that price-deflated profits are similar for low- and high-price shares. Even though low-price shares are less likely to report profits than high-price shares, price-deflated profits do not vary with price for the subset of firms that report profits. Because the positive overall relation between X_{t-1}/P_{t-1} and scale is due entirely to loss firms—the probability of losses and the magnitude of losses—we refer to it as the loss effect.

The second scale-driven empirical regularity, labeled the *return variance* effect, refers to the negative relation between scale and stock return variance. Figure 1, Panel B describes how the mean values of positive and negative abnormal returns, representing good and bad news, are negatively and positively related to price deciles. Figure 1, Panel C depicts the relevant implication of the variance effect: extreme good and bad news is more likely to be observed for low-price firms. Mean values of lagged price (P_{t-1}) for deciles of bad and good news (AR_t) increase from about \$15 for the most extreme bad and good news deciles (left and right edges of the figure) to just below \$25 for the less extreme bad and good news deciles (center of the figure).

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[1] To be consistent with Basu (1997), the dependent variable in Equation (1) should be market-adjusted earnings or X_{it}/P_{it-1} minus the cross-sectional mean of X_{it}/P_{it-1}. While we use X_{it}/P_{it-1} for consistency with other research, the two specifications are essentially similar when estimated year by year; only the intercept (α_0) is affected.

[2] Details of the sample and variables underlying this discussion are provided in Section IV.

FIGURE 1
Heterogeneity across Share Price Deciles: Loss and Return Variance Effects

Panel A: Loss Effect[a]
Panel B: Return Variance Effect[b]
Panel C: Implication of Return Variance Effect[c]

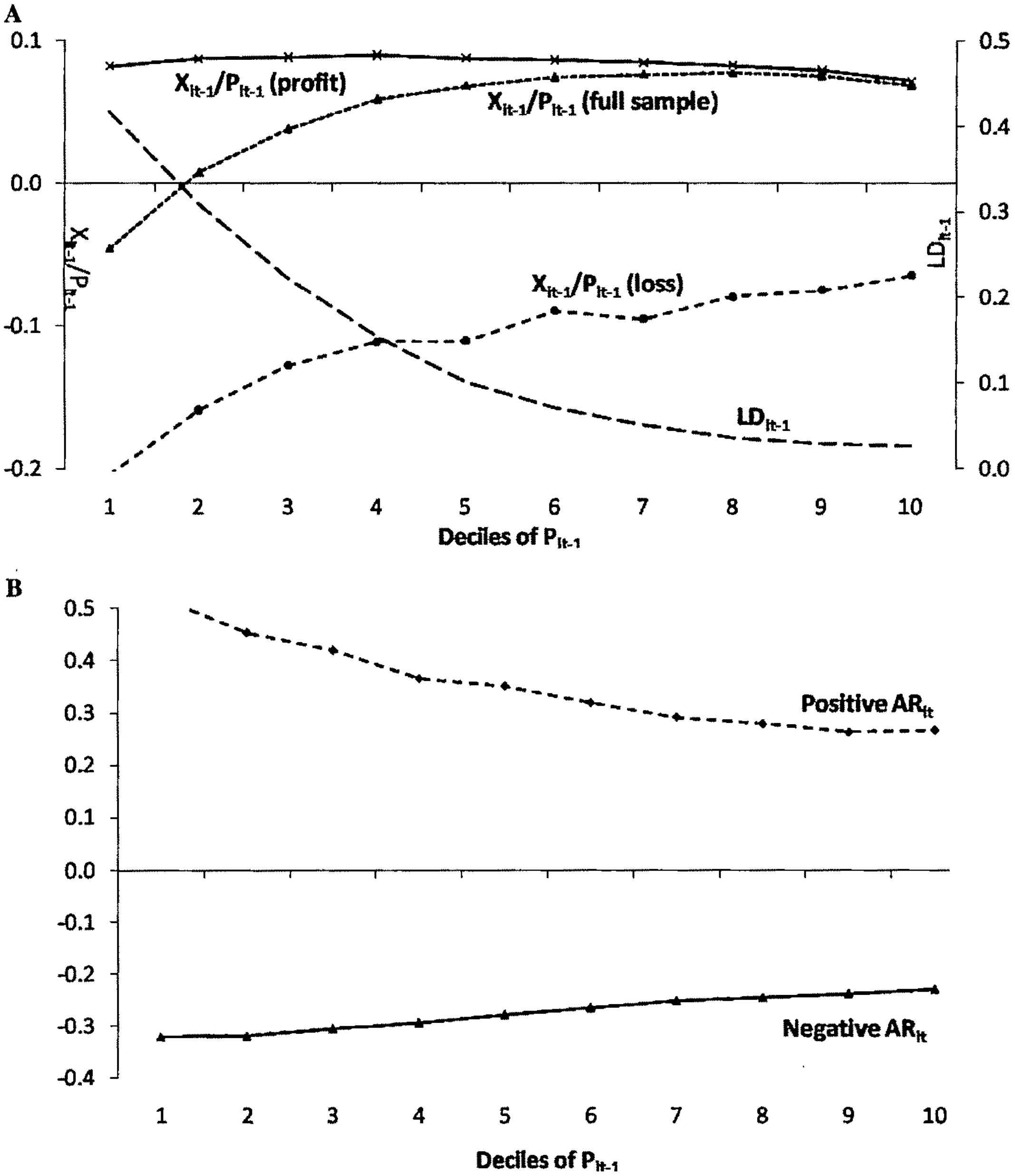

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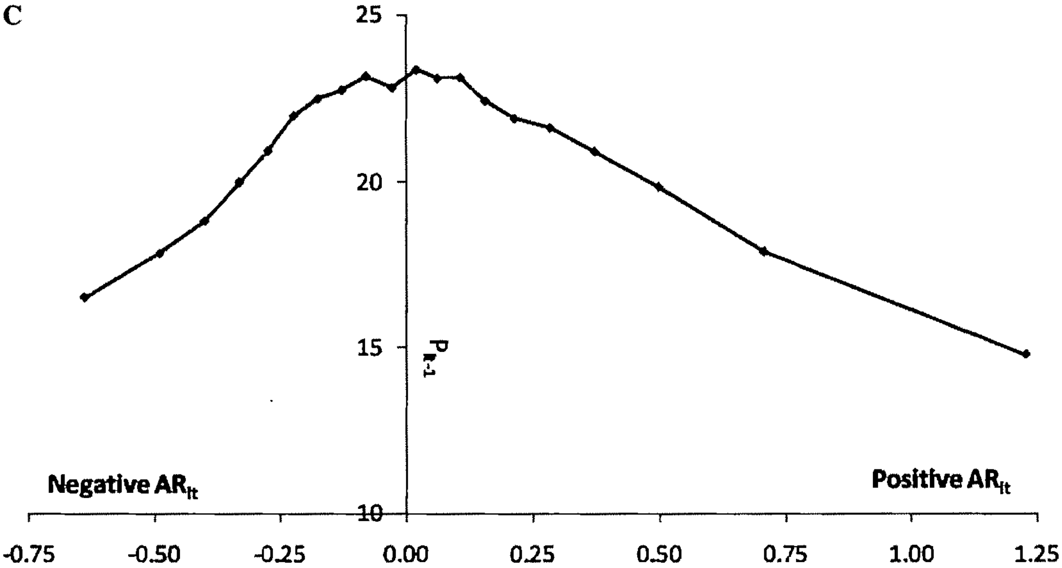
FIGURE 1 (continued)



The loss effect is that price-deflated earnings per share increases with share price because the probability of reporting a loss and the magnitude of price-deflated losses decrease with share price. The return variance effect is that magnitudes of positive and negative returns decline with share price. Variables for firm i and year t are defined as follow: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; and AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted index over the corresponding 12-month period. Additional details of all variables are provided in Appendix A. The mean values reported above are the averages of means for each annual cross-section containing firms with fiscal years ending in the same calendar year.

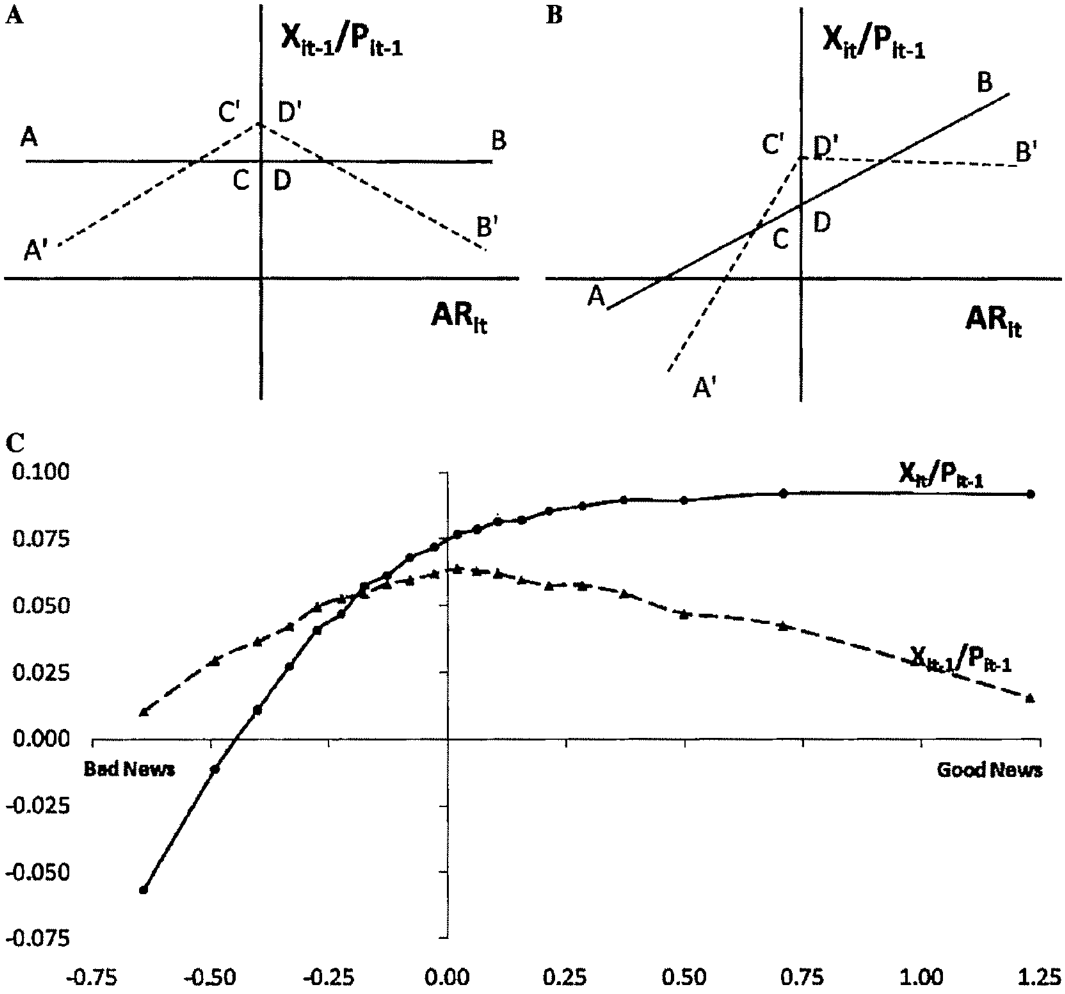
[a] Mean value of lagged earnings per share (X_{it-1}), scaled by lagged share price (P_{it-1}), and fraction of loss firms (LD_{it-1}) across deciles of lagged share price (P_{t-1}).

[b] Mean value of abnormal return (AR_{it}) for positive (good news) and negative (bad news) subsamples across deciles of lagged share price (P_{t-1}).

[c] Mean values of lagged price (P_{it-1}) for deciles of positive and negative abnormal return (AR_{it}).

Figure 2, Panel A illustrates the *predicted* joint impact of the return variance and loss effects on regressions of price-deflated lagged earnings (X_{t-1}/P_{t-1}) on abnormal returns (AR_t), estimated both for the overall sample and separately for good and bad news subsamples. Absent the loss and return variance effects described in Figure 1, lagged earnings should be unrelated to current abnormal returns and the overall sample regression should be represented by the flat line ACDB, corresponding to the sample mean of X_{t-1}/P_{t-1}. However, when the two effects are present separate regressions on bad and good news subsamples should be represented by the lines A′C′ and D′B′, respectively. For the bad news subsample, deciles associated with more negative news include more low-price shares (Figure 1, Panel C) and those shares have lower mean values of X_{t-1}/P_{t-1} (Figure 1, Panel A). Similarly, for the good news subsample, deciles associated with more positive news also include more low-price shares with lower mean values of X_{t-1}/P_{t-1}.

FIGURE 2
Impact of the Loss and Return Variance Effects on Earnings-Returns Regressions
Panel A: Prediction for Lagged Earnings (X_{it-1}/P_{it-1})
Panel B: Prediction for Current Earnings (X_{it}/P_{it-1})
Panel C: Mean Values of Lagged and Current Price-Deflated Earnings (X_{it-1}/P_{t-1} and X_{it}/P_{t-1}) for Deciles of Bad and Good News (AR_{it})



Panels A and B describe the predicted relations between lagged and current price-deflated earnings (X_{it-1}/P_{it-1} and X_{it}/P_{it-1}) and current abnormal returns (AR_{it}). Assuming that the full sample relation is described by ACDB, the loss and return variance effects are predicted to create an asymmetry between the separate relations for bad and good news subsamples (with AR_{it} < and > 0, respectively), as described by the lines A'C' and D'B'. Panel C describes the actual relations between X_{it-1}/P_{it-1} and X_{it}/P_{it-1} and AR_{it} by reporting mean values of lagged and current earnings for deciles of negative and positive AR_{it}. The mean values reported in Panel C are the averages of means for each annual cross-section containing firms with fiscal years ending in the same calendar year.

Variables for firm i and year t are defined as follow: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; and AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted index over the corresponding 12-month period. Additional details of all variables are provided in Appendix A.

In essence, even though abnormal returns are, on average, unrelated to lagged earnings, regressions of lagged earnings on abnormal returns estimated separately for bad (good) news subsamples will indicate a positive (negative) slope. The bad news slope (A′C′) minus the good news slope (D′B′) in Panel A of Figure 2 generates a positive β_1 coefficient when current earnings are replaced by lagged earnings in Equation (1). The joint impact of the loss and return variance effects leads to spurious evidence of differential timeliness.

Figure 2, Panel B repeats the analysis for the predicted impact of the two empirical regularities on the relation between price-deflated *current* earnings and abnormal returns. Assume that there is no conditional conservatism and that earnings are equally timely for good and bad news. That symmetric relation is described by the regression line ACDB, where the slope of the regression line represents timeliness or the sensitivity of contemporaneous earnings to news. Introducing the two effects will cause the slope of the regression line to be altered toward A′C′ (D′B′) for bad (good) news. The excess of the slope of A′C′ over that for D′B′ will erroneously be interpreted as evidence of differential timeliness due to conditional conservatism.

These predicted patterns are observed in actual data. Figure 2, Panel C reports mean values of price-deflated current and lagged earnings for deciles of positive and negative abnormal returns. The patterns reflected by these mean values in the left and right halves represent the slopes that would be reported in earnings-returns regressions estimated separately on bad and good news subsamples. The substantial asymmetric relation consistent with conditional conservatism observed for lagged earnings in Panel C confirms that the DT measure is associated with large upward bias. Observing patterns similar to those predicted in Panel A suggests that this bias is due to the loss and return variance effects. In addition, the similarity between the relation in Panel C for current earnings and the corresponding predicted relation in Panel B suggests that these two effects create substantial upward bias for estimates of β_1 from Equation (1) regressions based on current earnings.

The generality of the loss effect, which allows us to replace current earnings in Equation (1) with lagged earnings, is important for our research design. If the loss effect had only applied to current earnings, there is a potential concern that the increased likelihood of losses for low-price firms is somehow related to conditional conservatism, under which some of the losses reported this year are due to bad news disclosed this year being reflected in a more timely manner than good news this year. That concern, however, does not apply to lagged earnings, because prior-year earnings are reported before this year's news is disclosed. Given that it is not possible for news disclosed this year to be recorded in last year's earnings, it is not possible for bad news disclosed this year to be recorded in last year's earnings in a more timely manner than this year's good news.

Note that a strong correlation between lagged and current earnings does not alter this conclusion. That is, even though lagged earnings are related to current earnings, which are, in turn, related to current news, lagged earnings cannot be related to current news. This is because news can only reflect surprises, by definition, and current news must be unrelated to all lagged variables, including lagged earnings and lagged news. Therefore, any evidence of differential timeliness in the extent to which lagged earnings reflects current good and bad news must be spurious, and that same bias must also affect estimates of conditional conservatism for *current* earnings.

Because estimates of DT based on lagged earnings provide an indication of the extent to which estimates of DT based on current earnings are biased, we estimate Equation (1) separately for both current and lagged earnings in all of our analyses. An important benefit of this methodology is that it allows us to (1) show the extent to which cross-sectional and time-series variation in the DT measure estimated for current earnings is affected by cross-sectional and time-series variation in the bias associated with that measure, which is indicated by the DT measure estimated for lagged earnings, and (2) confirm that this variation in bias is caused by corresponding variation in the loss and return variance effects.

III. LINKS TO PRIOR RESEARCH ON POTENTIAL BIASES IN THE DT MEASURE

Dietrich et al. (2007) derive the general conditions under which slopes of the earnings-returns regressions differ for good and bad news samples, even when the underlying relation is similar. Their Equations (1.7a) and (1.7b) describe how each slope is potentially biased because of two effects—sample variance ratio bias and sample truncation bias—and they offer examples of conditions under which the two biases differ for good and bad news. The results in Dietrich et al. (2007, Table 2) indicate the magnitudes of the two biases and the extent to which they differ across good and bad news. As with the use of lagged earnings in this study, the regressions in Dietrich et al. (2007, Table 2) are estimated on data that should not exhibit conditional conservatism (obtained by scrambling residuals from returns-earnings regressions across firms to scrub any underlying differential timeliness).

While Dietrich et al. (2007) envision cases in which returns are related to earnings and the sample is homogeneous, the general conditions they derive apply to our case in which returns are unrelated to lagged earnings and the sample is heterogeneous. To elaborate, the sample variance ratio bias for the lagged earnings specification is zero for both good and bad news subsamples because the slope of regressions of returns on lagged earnings (represented by β in Dietrich et al. [2007]) is zero.[3] The sample truncation bias, however, which is a function of the covariance between lagged earnings and returns, estimated separately for good and bad news subsamples, is not zero. More importantly, the sample truncation bias differs across bad and good news subsamples because the slope of the X_{t-1}/P_{t-1} line in Panel C of Figure 2 is positive (negative) for bad (good) news.[4] As the loss and return variance effects combine to cause a positive (negative) covariance between abnormal returns and lagged earnings for bad (good) news, estimates of $\beta_0 + \beta_1$ (β_0) are biased upward (downward) for lagged earnings regressions based on Equation (1). The same effects will cause $\beta_0 + \beta_1$ (β_0) to be biased upward (downward) for the current earnings regression, which causes β_1 to be biased upward, thereby overstating substantially the DT measure of conditional conservatism.

One objective of Ball et al. (2010) is to minimize concerns raised by Dietrich et al. (2007). For example, they suggest that the sample variance ratio and sample truncation biases are not relevant and propose alternative estimates of good and bad news timeliness slopes in Equations (2.6a) and (2.6b), respectively. They then suggest that the DT measure is unbiased because the covariance between returns (R_t) and the expectation of earnings (I_t), conditional on returns ($E[I_t|R_t]$), is the same for good and bad news when conditional conservatism is absent.

Our evidence in Figure 2, Panel C, indicates, however, that this covariance differs across good and bad news. The mean values of X_{t-1}/P_{t-1} plotted for each decile of positive and negative abnormal returns represent the expectation of $E[I_{t-1}|R_t]$, and the covariance of those mean values with abnormal returns is clearly different for good and bad news because of the loss and return variance effects. Because the two effects carry over to current earnings, our evidence is inconsistent with the presumption in Ball et al. (2010) that the covariance of $E[I_t|R_t]$ and R_t is the same across good and bad news when conditional conservatism is absent.

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[3] There is in fact a weak, nonlinear relation between price-deflated lagged earnings (X_{t-1}/P_{t-1}) and current returns, which was first documented by Basu (1977) and has spawned the E/P anomaly literature. We confirm that this weak relation can be ignored because estimates of β and the sample variance ratio bias for our sample are close to zero. Note that that the E/P anomaly literature was initiated by Sanjoy Basu, whereas the conditional conservatism literature was initiated two decades later by Sudipta Basu.

[4] In Dietrich et al. (2007), the sample truncation bias is a function of the covariance between X, the earnings variable, and η, the non-earnings information that explains returns. In our case, because returns (R) is unrelated to X (lagged earnings) it is completely explained by non-earnings information; i.e., R and η are the same.

Given the apparent differences between the timeliness estimates derived by Ball et al. (2010) and Dietrich et al. (2007), it seems surprising that the same relations in Panel C of Figure 2, between lagged price-deflated earnings and current abnormal returns, describe why the DT measure is biased for both sets of estimates. It turns out (proof available from authors) that the estimates of timeliness in Equations (2.6a) and (2.6b) of Ball et al. (2010) are algebraically equivalent to the estimates in Equations (1.7a) and (1.7b), respectively, of Dietrich et al. (2007).

Givoly et al. (2007) provide evidence consistent with both upward and downward biases in estimates of conditional conservatism. A bias they investigate, referred to as the "aggregation effect," is caused by the difference between how information is presumed to arrive in one "chunk" in the DT model and how it actually arrives in multiple chunks over time. Because conditional conservatism is applied to the good or bad news in each piece of information, those details are lost to researchers using annual returns to generate a single measure of aggregate news. As a result, estimates of conditional conservatism are biased downward, especially for larger firms with less chunky information arrival. This aggregation effect is potentially related to the return variance effect underlying our bias, because more chunky information arrival is correlated with return variance and firm size is correlated with share price.

Beaver and Ryan (2009) offer a different reason for upward bias in the DT measure: equity returns are affected by the fact that risky debt imbeds a written put option on the firm. This put option absorbs more of the firm's economic asset returns for bad news relative to good news, yielding asymmetry in the direction of conditional conservatism. As a result, the choice of equity returns as a proxy for economic news can create spurious evidence of conditional conservatism, in the presence of risky debt. The authors support their argument by demonstrating that β_1 is higher among firms with more or riskier debt (i.e., firms with higher leverage, higher return volatility, and below investment grade credit ratings). We do not explore links between our results and those reported in Beaver and Ryan (2009).[5]

There is a vast literature based on both time-series and cross-sectional variation in conditional conservatism, but little attention is paid to corresponding variation in biases in estimates of the DT measure. Examples of studies investigating time-series variation include Basu (1997), Givoly and Hayn (2000), Holthausen and Watts (2001), Ryan and Zarowin (2003), and Shivakumar and Waymire (2003). While we document the extent to which time-series variation in the loss and return variance effects bias estimates of conditional conservatism, we do not investigate whether the bias we document affects the results in each study. Related to the loss effect, Klein and Marquardt (2006) show how time-series variation in the fraction of loss firms is explained by corresponding variation in annual estimates of β_1 from the Basu current earnings regression. Our results, however, suggest that causality can run in the opposite direction, as variation in our loss effect over time causes spurious variation in estimates of β_1.[6]

Examples of studies investigating cross-sectional variation in conditional conservatism include Giner and Rees (2001), Pae et al. (2005), Roychowdhury and Watts (2007), Ball et al. (2010), Easton et al. (2009), and Beaver and Ryan (2009). Again, while we consider some aspects of cross-sectional variation in estimates of β_1, we do not investigate the extent to which inferences in these studies are affected by corresponding variation in our loss and return variance effects. We do, however, offer some preliminary evidence on the extent to which the firm-year estimates of conditional conservatism proposed by Khan and Watts (2009) are affected by the loss and return variance effects.

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[5] Another source of potential bias in estimates of the Basu measure, due to simultaneity in the earnings-returns and returns-earnings regressions, is described in Beaver et al. (2008).

[6] Note that the fraction of loss firms in the overall sample differs in important ways from our loss effect, even though the two are closely related. First, the fraction of loss firms is just one part of the loss effect (the other part relates to the magnitude of price-deflated losses) Second, the *fraction* of loss firms in the *overall* sample differs from our loss effect, which is based on the *difference* between good and bad news subsamples in the *relation* between price and the fraction of loss firms/magnitude of losses.

IV. SAMPLE AND DESCRIPTIVE STATISTICS

We collect our sample from the intersection of Compustat annual files (including the research file) and the CRSP monthly returns file. We scan the Compustat files for firm-years ending during the period 1963 to 2006 that have non-missing values in the current and prior year for earnings per share before extraordinary items (X_{it}), common shares outstanding, and fiscal year-end stock price (P_{it}). See Appendix A for further details of variables. We note that the return variance and loss effects are higher for low-price firms, and are considerably higher for firms with share prices below $1. We impose a minimum lagged price filter ($P_{it-1} > \$1$) to exclude the disproportionate effects of these very low-price firms; including these firm-years would cause even greater biases in our estimates of the DT measure.

Next, we match these observations to compounded "inter-announcement" 12-month returns, which begin with the fourth month of the fiscal year. We require non-missing returns on the CRSP monthly returns file for the 12 months beginning with the fourth month of the current fiscal year and ending with the third month of the next fiscal year. Compounding these monthly returns generates a buy-and-hold return (R_{it}) that proxies for the return from holding the stock between last year's earnings announcement and this year's announcement. We compute corresponding market returns based on the CRSP equally weighted market portfolio (including distributions), which are then subtracted from firm returns to generate abnormal returns (AR_{it}).

Basu (1997) considers different specifications for both the dependent variable (e.g., unadjusted and market-adjusted earnings) and the independent variable (e.g., unadjusted and market-adjusted returns, R_{it} and AR_{it}, respectively, computed over different 12-month windows). To improve comparability with key results reported in the prior literature, we report results based on unadjusted earnings and market-adjusted returns (AR_{it}) cumulated over the inter-announcement window. We confirm later that our main findings are not affected when we use the other dependent and independent variable specifications.

To be consistent with the common practice in this literature, we exclude firm-years falling in the top or bottom 1 percent of the annual cross-sections of any of the following variables: $1/P_{it-1}$, X_{it}/P_{it-1}, X_{it-1}/P_{it-1}, and AR_{it}. The resulting sample contains 124,562 firm-year observations.

Table 1, Panel A provides some statistics for the pooled distributions of the different variables. Observing a higher median than mean for X_{it}/P_{it-1} is consistent with the general findings that price-deflated earnings are left-skewed and firms reporting large losses tend to have lower prices (e.g., Durtschi and Easton 2005). Observing a higher mean than median for returns (R_{it}) indicates a right-skewed distribution, also consistent with general findings regarding the distribution of returns.[7] The negative mean and median abnormal returns (AR_{it}) are also expected, as (1) our sample firms are larger on average than the firms included in the equally weighted CRSP market index, and (2) large firm returns tend to be lower than small firm returns on average. The mean value of 0.572 for the bad news indicator variable (D_{it}) suggests that 57.2 percent of firm-years are classified as bad news firms in our sample. Similarly, the mean value of 0.179 for the loss indicator variable (LD_{it}) suggests that 17.9 percent of our sample firm-years report losses.

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[7] Right skewness in returns and normally distributed error terms in the traditional linear regression model of returns on earnings would imply that earnings should be right-skewed. The fact that earnings are left-skewed is therefore anomalous, especially given that operating cash flows are also right-skewed. Conditional conservatism is one explanation for this anomaly (Basu 1995).

TABLE 1

Descriptive Statistics for Pooled Sample (124,562 Firm-Years, 1963–2006)

Panel A: Univariate Statistics

Variable	Mean	Std. Dev.	Percentiles of Distribution 1st	25th	50th	75th	99th
X_{it}/P_{it-1}	0.050	0.135	−0.493	0.022	0.063	0.107	0.339
$1/P_{it-1}$	0.119	0.136	0.014	0.037	0.066	0.140	0.667
$SIGN_{it}/P_{it-1}$	0.045	0.175	−0.571	0.022	0.045	0.092	0.615
R_{it}	0.160	0.512	−0.687	−0.145	0.089	0.365	1.894
R_{mt}	0.172	0.246	−0.251	0.032	0.158	0.310	0.888
AR_{it}	−0.012	0.466	−0.842	−0.294	−0.063	0.187	1.521
D_{it}	0.572	0.495	0.000	0.000	1.000	1.000	1.000
$D_{it} * AR_{it}$	−0.170	0.219	−0.842	−0.294	−0.063	0.000	0.000
LD_{it}	0.179	0.383	0.000	0.000	0.000	0.000	1.000

Panel B: Pair-Wise Correlations[a]

	X_{it}/P_{it-1}	$1/P_{it-1}$	$SIGN_{it}/P_{it-1}$	R_{it}	AR_{it}	D_{it}	$D_{it} * AR_{it}$	LD_{it}
X_{it}/P_{it-1}		−0.098	0.556	0.350	0.308	−0.241	0.315	−0.664
$1/P_{it-1}$	−0.209		0.405	0.000	−0.034	0.020	−0.077	0.331
$SIGN_{it}/P_{it-1}$	0.580	0.056		0.198	0.178	−0.128	0.165	−0.664
R_{it}	0.210	0.099	0.136		0.791	−0.675	0.730	−0.230
AR_{it}	0.202	0.072	0.138	0.877		−0.857	0.960	−0.234
D_{it}	−0.196	−0.005	−0.118	−0.588	−0.706		−0.893	0.166
$D_{it} * AR_{it}$	0.302	−0.069	0.177	0.553	0.732	−0.671		−0.254
LD_{it}	−0.689	0.300	−0.669	−0.154	−0.163	0.166	−0.295	

Panel C: Proportion of Firms Reporting a Loss in Year *t* ($X_{it} < 0$)[b]

Sample	# of Firm-Years	% of Sample	Loss Firms in *t*	% Loss in *t*
Full sample	124,562	100.00%	22,305	17.91%
Good news ($AR_{it} \geq 0$)	53,339	42.82%	5,628	10.55%
Bad news ($AR_{it} < 0$)	71,223	57.18%	16,677	23.42%
Good news ($R_{it} \geq 0$)	74,780	60.03%	8,283	11.08%
Bad news ($R_{it} < 0$)	49,782	39.97%	14,022	28.17%

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[a] Pearson below the main diagonal and Spearman above. All correlations are significant at the 1 percent level, except the Pearson correlation between D_{it} and $1/P_{it-1}$ and the Spearman correlation between $1/P_{it-1}$ and R_{it}.

[b] Good and bad news is defined relative to $AR_{it} = 0$, as well as relative to $R_{it} = 0$ in the bottom two rows.

Variables measured for firm *i* in year *t* are defined as follow: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; D_{it} is a bad news indicator variable set to 1 (0) when AR_{it} is negative (otherwise), representing bad (good) news subsamples; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted market index over the 12-month period corresponding to R_{it}; $SIGN_{it}$ equals −1 when $X_{it} < 0$, and 1 otherwise; LD_{it} equals 1 when $X_{it} < 0$, and 0 otherwise. Additional details of all variables are provided in Appendix A. The sample consists of firm-years with non-missing values for the current and prior year for X_{it}, P_{it}, and common shares outstanding, non-missing values for R_{it} and P_{it-1} above \$1. Also, we exclude firm-years that fall below the first percentile or above the 99th percentile of the annual distributions of any of the following variables: $1/P_{it-1}$, X_{it}/P_{it-1}, X_{it-1}/P_{it-1}, and AR_{it}.

Table 1, Panel B reports the Pearson and Spearman correlations for different pair-wise combinations of variables. Two key correlations that are anticipated by the loss effect results reported in Figure 1, Panel A are as follows. First, the loss indicator (LD_{it}) is strongly positively related to $1/P_{it-1}$; i.e., low-price firms are more likely to report losses. Second, X_{it}/P_{it-1} is negatively related to $1/P_{it-1}$; i.e., low-price firms are more likely to have lower values of price-deflated earnings, mainly because the losses they report are larger when deflated by price.

Table 1, Panel C provides some information about the incidence of loss firm-years in our sample. Of the 17.9 percent of our sample reporting losses, the good news subsample reports losses only about 11 percent of the time, whereas the bad news subsample reports losses about 23 percent of the time. The bottom two rows of Panel C describe loss behavior for news partitions based on unadjusted or raw returns, rather than market-adjusted or abnormal returns. This alternative partition for news increases the fraction of good news firms from 43 to 60 percent. Those results show that good news firms report about 11 percent losses, similar to the news partitions based on abnormal returns. The smaller bad news subsample, however, reports losses almost 28 percent of the time.

V. RESULTS

Replicating Pooled Regressions Estimated in Basu (1997)

Although we emphasize results based on annual cross-sectional regressions, given that coefficient estimates vary substantially over time, we first report results based on pooled regressions to allow comparisons to prior research. Table 2, Panel A contains the results of estimating the Basu (1997) regression for unadjusted and market-adjusted price-deflated earnings levels for the full sample of 124,562 firm-years. The independent variable is market-adjusted abnormal returns (AR_{it}), which is also used to create the good and bad news partitions. The first row reports the coefficient estimates and associated t-statistics for unadjusted price-deflated earnings (X_{it}/P_{it-1}). The coefficient β_1, which is the Basu measure of differential timeliness or conditional conservatism, is 0.204. It is slightly lower than estimates reported in prior research, possibly because of the additional minimum price filter we impose when selecting our sample.[8]

The second row in Table 2, Panel A is based on market-adjusted earnings ($X_{it}/P_{it-1} - mean\ X_t/P_{t-1}$), also considered in Basu (1997). The main difference between this regression and the earlier one is that the intercept α_0 is smaller by 0.050, which corresponds to the mean level of price-deflated earnings of 0.050 reported in Panel A of Table 1. The results in Panel B of Table 2 confirm that the choice of market-adjusted returns versus unadjusted returns for the independent variable does not alter the results in a substantive way. Even though switching from abnormal returns to unadjusted returns alters substantially the good and bad news partitions (see Panel C of Table 1), the main coefficient of interest (β_1) and the associated t-statistics are similar to those reported in Panel A.

Table 2, Panel C provides the results of our efforts to replicate the results in Basu (1997) using our data sources and software code but the same sample period (from 1963 to 1990) and sample selection procedures (e.g., listed on NYSE or AMEX) as in Basu (1997). Our sample size is about 12 percent larger, possibly because we use current exchange membership, which may differ from the prevailing membership when the Basu (1997) sample was collected. The first and third rows contain the results from Panels A and B of Table 1 in Basu (1997), which correspond to regressions of unadjusted earnings on unadjusted returns and market-adjusted earnings on market-adjusted returns, respectively. The second and fourth rows present the results of our efforts to replicate those

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[8] Basu (1997) and others also use the difference between R^2 for the bad and good news earnings-returns regressions as an alternative measure of conditional conservatism. We believe these R^2 values are not comparable as the variances of X/P_{t-1} may not be similar for the good and bad news subsamples.

TABLE 2

Pooled Regressions of Earnings on Returns for Good and Bad News Subsamples

Panel A: Full Sample, 1963–2006 (124,562 Firm-Years), and Return Measure (R) is AR_{it}

Earnings Variable (E)		α_0	α_1	β_0	β_1	Adj. R^2
X_{it}/P_{it-1}	Coefficient	0.085	−0.001	−0.013	0.204	9.20%
	t-statistic	112.79***	−1.18	−6.63***	59.63***	
X_{it}/P_{it-1} − *mean* X_t/P_{t-1}	Coefficient	0.035	−0.009	−0.006	0.176	9.67%
	t-statistic	48.60***	−8.22***	−3.02***	52.48***	

Panel B: Full Sample, 1963–2006 (124,562 Firm-Years), and Return Measure (R) is R_{it}

Earnings Variable (E)		α_0	α_1	β_0	β_1	Adj. R^2
X_{it}/P_{it-1}	Coefficient	0.078	−0.011	−0.001	0.236	10.64%
	t-statistic	114.06***	−9.52***	−0.52	58.57***	
X_{it}/P_{it-1} − *mean* X_t/P_{t-1}	Coefficient	0.024	−0.011	0.003	0.201	9.48%
	t-statistic	37.06***	−9.73***	1.86*	51.13***	

Panel C: Replication of Table 1, Panel A and Panel B in Basu (1997) Using the Same Sample Period 1963–1990 and Sample Selection Procedures[a]

Source and Sample Size		α_0	α_1	β_0	β_1	Adj. R^2
Table 1, Panel A, from Basu (1997);	coefficient	0.090	0.002	0.059	0.216	10.09%
43,321 firm-years	t-statistic	68.03***	0.86	18.34***	20.66***	
Our sample from the same sample period;	coefficient	0.095	0.003	0.042	0.260	14.06%
48,677 firm-years	t-statistic	90.97***	1.51	17.48***	31.04***	
Table 1, Panel B, from Basu (1997);	coefficient	0.030	0.014	0.047	0.256	12.48%
43,321 firm-years	t-statistic	22.62***	6.07***	11.03***	27.14***	
Our sample from the same sample period;	coefficient	0.032	0.007	0.025	0.235	13.82%
48,677 firm-years	t-statistic	29.25***	4.11***	7.72***	35.71***	

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*, **, *** Statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

[a] The earnings variable (E) is X_{it}/P_{it-1}, and return measure (R) is R_{it} in the first two rows, and the earnings measure is X_{it}/P_{it-1} − mean X_t/P_{t-1} and return measure is AR_{it} in the bottom two rows.

This table provides results of pooled regressions of two earnings variables (E) on two measures of returns (R): $E = a_0 + a_1 D_{it} + \beta_0 R + \beta_1 R * D_{it} + \varepsilon_{it}$.

The earnings and return measures are derived from the following variables for firm i in year t: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted market index over the 12-month period corresponding to R_{it}; *mean* X_t/P_{t-1} is the cross-sectional mean of X_{it}/P_{it-1} in year t; and D_{it} equals 1 when the return measure is < 0, and 0 otherwise, representing bad and good news, respectively. Additional details of all variables are provided in Appendix A.

All t-statistics are heteroscedasticity-adjusted according to White (1980).

two specifications. Because we find no major differences between the first and second rows or between the third and fourth rows, we conclude that there are no important methodological differences between Basu (1997) and our study.

Impact of Loss and Return Variance Effects on Estimates of Conditional Conservatism

The results reported in Table 3, Panel A provide empirical support for the intuition developed in Figures 1 and 2 by estimating different versions of Equation (1)-type regressions using different

TABLE 3

Annual Cross-Sectional Regressions of Earnings on Returns for Good and Bad News Subsamples
(124,562 Firm-Years, 1963–2006)

Panel A: Impact of Return Variance and Loss Effects on the Basu (1997) Earnings-Returns Regression

Variable (*V*)		α_0	α_1	β_0	β_1	Adj. R^2
$1/P_{it-1}$	Coefficient	0.089	−0.002	0.073	−0.160	5.38%
	t-statistic	17.56***	−0.53	10.89***	−11.14***	
$SIGN_{it-1}/P_{it-1}$	Coefficient	0.051	0.000	−0.007	0.038	1.20%
	t-statistic	12.08***	0.13	−1.01	2.94***	
X_{it-1}/P_{it-1}	Coefficient	0.066	0.002	−0.035	0.116	3.09%
	t-statistic	10.12***	0.76	−8.22***	12.66***	
X_{it}/P_{it-1}	Coefficient	0.081	0.007	0.019	0.185	14.76%
	t-statistic	12.06***	3.86***	3.20***	15.33***	

Panel B: Replacing Lagged Earnings (X_{t-1}) with Earnings from the Year before (X_{t-2})

Variable (*V*)		α_0	α_1	β_0	β_1	Adj. R^2
X_{it-2}/P_{it-1}	Coefficient	0.071	0.000	−0.035	0.104	2.03%
	t-statistic	10.34***	0.19	−8.53***	10.86***	
X_{it-2}/P_{it-2}	Coefficient	0.070	0.000	−0.034	0.114	2.87%
	t-statistic	10.86***	0.09	−9.46***	9.90***	

Panel C: Scale by Lagged Total Assets per Share Instead of Lagged Price

Variable (*V*)		α_0	α_1	β_0	β_1	Adj. R^2
$1/TA_{it-1}$	Coefficient	0.077	−0.006	0.094	−0.315	2.12%
	t-statistic	12.88***	−1.13	7.42***	−8.08***	
X_{it-1}/TA_{it-1}	Coefficient	0.046	0.005	−0.030	0.121	1.21%
	t-statistic	14.53***	1.77*	−6.05***	7.08***	
X_{it}/TA_{it-1}	Coefficient	0.054	0.013	0.001	0.171	4.37%
	t-statistic	19.56***	5.41***	0.25	9.32***	

Panel D: Include $1/P_{t-1}$ as Additional Regressor to Control for Loss and Return Variance Effects

$$V = \alpha_0 + \alpha_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \gamma \frac{1}{P_{it-1}} \varepsilon_{it}$$

Variable (*V*)		α_0	α_1	β_0	β_1	γ	Adj. R^2
X_{it-1}/P_{it-1}	Coefficient	0.091	0.001	−0.013	0.067	−0.277	12.71%
	t-statistic	16.00***	1.01	−4.91***	12.66***	−13.47***	
X_{it}/P_{it-1}	Coefficient	0.096	0.007	0.032	0.158	−0.157	18.61%
	t-statistic	15.35***	4.52***	5.74***	15.91***	−9.43***	

(continued on next page)

TABLE 3 (continued)

*, **, *** Statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.
This table provides results of annual regressions of different variables (V) on abnormal returns (AR_{it}): $V = a_0 + a_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \varepsilon_{it}$. The variables that appear as dependent variables and AR_{it} are derived from the following variables for firm i in year t: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; TA_{it} is total assets per share; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted market index over the 12-month period corresponding to R_{it}; D_{it} equals 1 when AR_{it} is < 0, and 0 otherwise, representing bad and good news, respectively; and $SIGN_{it}$ equals -1 when $X_{it} < 0$, and 1 otherwise. Additional details of all variables are provided in Appendix A.
The annual regressions are estimated separately for firm-years with fiscal years ending in the same calendar year. The coefficients are the means of those annual coefficients and the t-statistics are derived from the time-series distributions of those coefficients.

dependent variables, each of which identifies a specific aspect of the loss and return variance effects. Unlike the pooled regressions in Table 2, the Table 3 regressions report the mean of coefficients from 44 annual regressions. Reported t-statistics are derived from the distribution of those coefficients.

The first row describes the results of replacing the dependent variable in the Basu (1997) regression (X_{it}/P_{it-1}) with $1/P_{it-1}$. Based on the return variance effect, we expect low-price firms with high return variances to be over-represented when abnormal returns are very positive and very negative. That is, the positive (negative) slopes for bad (good) news reported for lagged price in Panel C of Figure 2 should be inverted when we investigate $1/P_{it-1}$, the inverse of lagged price. As predicted, the good news slope in the first row is positive ($\beta_0 = 0.073$), and the slope for bad news firms is negative ($\beta_0 + \beta_1 = 0.073 - 0.160 = -0.087$).

The second row in Panel A of Table 3 investigates the joint impact of the variance effect and the first part of the loss effect, which is the higher frequency of losses for low-price shares. We replace $1/P_{it-1}$ in the first row with the product of $1/P_{it-1}$ and the sign of reported lagged earnings ($SIGN_{it-1}$), coded to be -1 and $+1$ when X_{t-1} is negative and positive, respectively. Given that low-price shares are over-represented when abnormal returns are very positive and negative, and given that low-price shares are more likely to report a loss, we expect more (fewer) losses for larger (smaller) magnitudes of abnormal returns. That is, we expect a positive (negative) slope for bad (good) news firms. Consistent with that prediction, the good news slope is negative ($\beta_0 = -0.007$) and the slope for bad news firms is positive ($\beta_0 + \beta_1 = -0.007 + 0.038 = 0.031$).

The third row in Panel A of Table 3 also incorporates the second part of the loss effect, which is the larger magnitude of price-deflated losses for low-price shares, by replacing $SIGN_{it-1}/P_{it-1}$ in the second row with X_{it-1}/P_{it-1}. As shown in Panel C of Figure 2, combining the loss and return variance effects should produce lower (higher) mean values of X_{it}/P_{it-1} closer to the edges (center) of the abnormal returns axis; i.e., we expect a positive (negative) slope for bad (good) news firms. Consistent with this prediction, the good news slope is negative ($\beta_0 = -0.035$) and the slope for bad news firms is positive ($\beta_0 + \beta_1 = -0.035 + 0.116 = 0.081$). In combination, the return variance effect and the two components of the loss effect create substantial spurious evidence of conditional conservatism, represented by the estimate of $\beta_1 = 0.116$. As this year's returns refer to a window that begins after last year's earnings are announced, there should be no evidence of differential timeliness and β_1 should be zero in this row of Table 2.

The bottom row in Panel A of Table 3, which is based on Equation (1), replaces lagged earnings in the third row with current earnings. Consistent with the X_{it}/P_{it-1} line in Panel C of Figure 2, there is considerable asymmetry between the slopes for the bad and good news subsamples: whereas the slope for good news firm-years is mildly positive ($\beta_0 = 0.019$) the slope for bad news firm-years is substantially positive ($\beta_0 + \beta_1 = 0.019 + 0.185 = 0.204$). Comparing this asymmetry with that for lagged earnings in the third row (β_1 of 0.185 versus 0.116) suggests that over 60 percent of the estimated DT measure is due to the bias we document. While 60 percent is a substantial level of bias, note that it represents a lower bound for the extent to which the DT measure overstates conditional conservatism. Any remaining asymmetry in the fourth row should not be viewed as evidence of conditional conservatism, as some of it is likely due to differential sample variance ratio bias between good and bad news subsamples and other sources of differential sample truncation bias not present in the lagged earnings specification (Dietrich et al. 2007).[9]

Table 3, Panel B confirms that results similar to the lagged earnings specification are obtained when we replace lagged earnings in the third row of Panel A with earnings from the year before (X_{t-2}). The first and second rows in Panel B consider deflation by price from one and two years ago (P_{t-1} and P_{t-2}), respectively. The similarity between the estimates for β_1 reported in Panel B (0.104 and 0.114) and those reported for lagged earnings in Panel A (0.116) confirm that the return variance and loss effects we document are both systematic (not unique to X_{t-1}) and robust (e.g., not driven by deflating by P_{t-1}).

Table 3, Panel C suggests that the loss and return variance effects are general scale effects, not contingent on scale being measured by share price. That is, we use lagged total assets per share (TA_{it-1}) as an alternative deflator and observe results very similar to those reported for lagged price in Panel A. Again, we find spurious evidence of differential timeliness, indicated by large and significant estimates of β_1 when the dependent variable is lagged earnings. The results in Table 3, Panel D indicate that attempts to control for scale by adding the deflator ($1/P_{t-1}$) as an additional regressor (e.g., Beaver and Ryan 2009) reduces the impact of the loss and return variance effects but does not eliminate it; the estimates for β_1 are smaller than the corresponding values in Panel A, but are still quite large.[10]

We also show that the loss and return variance effects impact both low- and high-price shares; i.e., deleting low-price shares does not eliminate spurious evidence of differential timeliness. We confirm the results in Easton et al. (2009) that estimates of β_1 for the current earnings specification are significantly positive in all price quintiles, though the magnitudes of these estimates decrease with share price. More important, we show that corresponding estimates of β_1 for the lagged earnings specification are also significantly positive in all price quintiles

VI. ADDITIONAL ANALYSES

Explaining Time-Series Variation in Conditional Conservatism

The mean coefficients from annual Basu (1997) regressions reported in the bottom row of Table 3, Panel A, mask considerable time-series variation in annual coefficient estimates. The top solid line in Figure 3, labeled X_t/P_{t-1}, shows how the annual differential timeliness estimate (β_1) varies from values close to zero early in the sample period to values above 0.3 around 1990. Much of this variation must be spurious, however, and due to time-series variation in the return variance and loss effects because β_1 estimates exhibit substantial comovement with corresponding estimates

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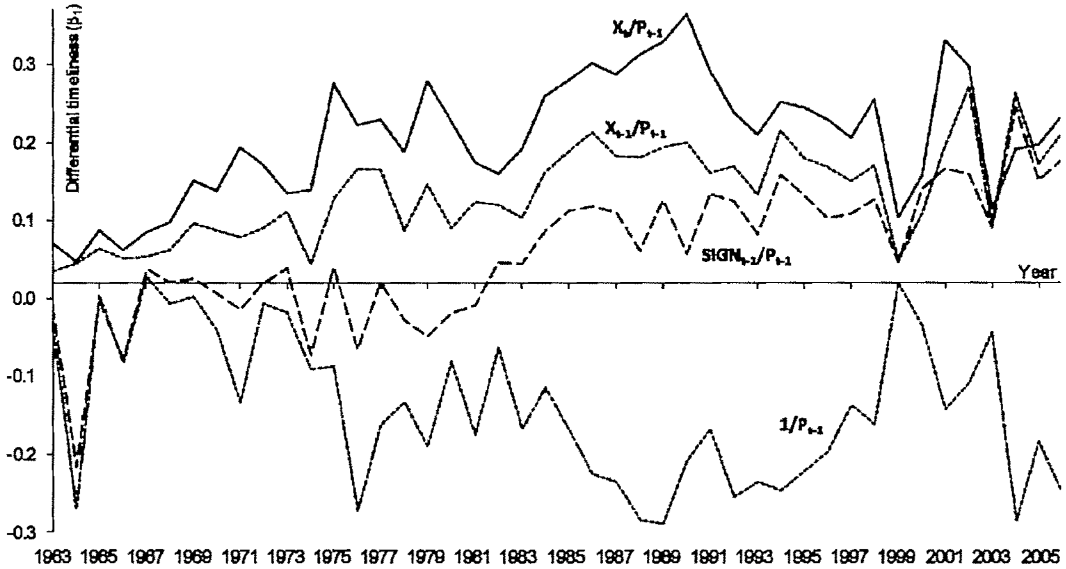
[9] One way to mitigate our bias is to subtract X_{t-1}/P_{t-1} from the left-hand side of Equation (1). Lobo et al. (2008) do so, not to mitigate our bias but because X_{t-1}/P_{t-1} serves as an expectation for X_t/P_{t-1}.

[10] We also found similar results for current and lagged earnings when we considered the following unscaled version of Equation (1): X_{it} (or X_{it-1}) $= \alpha_0 P_{it-1} + \alpha_1 D_{it} * P_{it-1} + \beta_0 * AR_{it} * P_{it-1} + \beta_1 * D_{it} * AR_{it} * P_{it-1} + \varepsilon_{it}$.

FIGURE 3
Differential Timeliness Coefficient Estimates (β_1) from Annual Regressions (124,562 Firm-Years, 1963–2006)



This figure provides differential timeliness coefficient estimates from annual regressions of four variables (V) on abnormal returns (AR_{it}): $V = a_0 + a_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \varepsilon_{it}$. Annual regressions are estimated for fiscal years ending in the same calendar year.

Variables for firm i and year t are defined as follow: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted index over the corresponding 12-month period; D_{it} equals 1 when AR_{it} is < 0, and 0 otherwise, representing bad and good news, respectively; and $SIGN_{it}$ equals -1 when $X_{it} < 0$, and 1 otherwise. Additional details of all variables are provided in Appendix A.

from the lagged earnings specification, represented by the dotted line, labeled X_{t-1}/P_{t-1}. We confirm this conjecture by investigating time-series variation in the return variance and loss effects.

The bottom dotted line in Figure 3 (labeled $1/P_{t-1}$) describes time-series variation in the return variance effect by reporting the estimated values of β_1 for annual regressions when we replace the dependent variable in the Basu (1997) regression (X_{it}/P_{it-1}) with the inverse of lagged price ($1/P_{it-1}$). The annual estimates that vary between 0 and -0.3 describe time-series variation around the mean estimate of -0.160 reported in the first row of Table 3, Panel A. The main finding is that years with greater return variance effects, as indicated by more negative values of β_1 estimates from the $1/P_{it-1}$ regressions, have more positive values of β_1 estimates for the X_{it}/P_{it-1} and X_{it-1}/P_{it-1} regressions. Even though the spurious evidence of differential timeliness in the X_{it-1}/P_{it-1} regressions is jointly determined by both the return variance and loss effects, the return variance effect appears to play a major role, as the time-series patterns for X_{it}/P_{it-1} and X_{it-1}/P_{it-1} in the top half are largely mirror-images of the return variance pattern in the bottom half. We show later that the impact of the return variance effect is muted in the early years when the loss effect is low.

As with the analyses described in Section V, we consider the loss effect in two stages. We report estimates of β_1 for annual regressions based on $SIGN_{t-1}/P_{t-1}$, which allows us to determine the joint impact of the return variance effect and the *fraction* of loss firms, which is the first part of the loss effect. We then compare those results with the estimates of β_1 for the X_{it-1}/P_{it-1} regressions to determine the incremental impact of the *magnitude* of price-deflated losses, which is the second part of the loss effect.

The middle dashed line in Figure 3, labeled $SIGN_{t-1}/P_{t-1}$, shows a pattern of time-series variation in estimates of β_1 that resembles the time-series variation exhibited by β_1 from annual DT regressions (the top solid line in Figure 3); the correlation between the two series of β_1 estimates is 0.53. That resemblance increases further when we also incorporate the magnitude of losses, represented by the middle dotted line, labeled X_{t-1}/P_{t-1}. The correlation between estimates of β_1 for the current and lagged earnings specifications is 0.81.

Because β_1 represents the difference between the separate timeliness for the bad and good news samples, $\beta_0 + \beta_1$ and β_0, respectively, we investigate next whether the high comovement between β_1 estimates from the current and lagged earnings specifications reflect high comovement between the corresponding slopes from the good and bad news subsamples. The results graphed in Figure 4 confirm that conjecture; the correlation between year-to-year changes in estimates of β_0 reported in Panel A for current and lagged earnings for the good news subsample is 0.74, and the corresponding correlation for $\beta_0 + \beta_1$ estimates for the bad news subsample reported in Panel B is 0.80.

The plots in Figure 5 confirm that time-series variation in estimates of β_1 for the lagged earnings specification is due to time-series variation in the loss and return variance effects. Whereas the evidence in Figures 3 and 4 describes time-series variation in the implications of the return variance and loss effects on Equation (1) regressions based on lagged earnings, Figure 5 documents whether those implications are supported by direct evidence on time-series variation in the original return variance and loss effects by estimating regressions of price-deflated lagged earnings (X_{t-1}/P_{t-1}) and abnormal returns (AR_{it}) on lagged price (P_{t-1}). Stated differently, whereas Figures 3 and 4 describe time-series variation in the implications of the return variance and loss effects reported in Panel C of Figure 2, Figure 5 describes time-series variation in the loss and return variance effects reported in Panels A and B of Figure 1.

Also, by reporting variation separately for the good and bad news subsamples in Panels A and B, respectively, Figure 5 provides more detail about how variation in the *difference* between the loss and return variance effects between the two subsamples reported in Figure 4 is generated by the separate time-series variation for each subsample. For purposes of comparison, we also report the Figure 4 estimates of timeliness for the good news sample (β_0) and bad news sample ($\beta_0 + \beta_1$), respectively, for the lagged earnings specification (X_{t-1}/P_{t-1}). Whereas estimates for the loss and return variance effects are measured against the left scale in each panel, the timeliness estimates are measured on the right scale.

Observing positive values in general for the line labeled "Loss Effect (GN)" in Figure 5, Panel A suggests that mean values of X_{t-1}/P_{t-1} increase with share price for the good news subsample, consistent with the overall sample results in Figure 1, Panel A. Values close to zero early in the sample period suggest that mean values of X_{t-1}/P_{t-1} are similar for low- and high-price stocks, but the higher values observed later in the sample period indicate that mean values of X_{t-1}/P_{t-1} are substantially higher for high-price stocks. The generally negative values for the line labeled "Ret. Var. Effect (GN)" suggest that mean values of AR_{it} decrease with share price for the good news subsample, consistent with the overall sample results in Figure 1, Panel B. As with the loss effect, the return variance effect for good news firms is relatively low early in the sample period, but increases substantially toward the end of that period.

The results in Figure 5, Panel B suggest that the loss and return variance effects vary substantially through time for the bad news subsample, too. Whereas values for the loss effect are generally large and positive later in the sample period, consistent with the overall sample results in Panel A of Figure 1, they are close to zero and even negative during the early years. Note that a negative estimate for the loss effect implies that mean values of X_{t-1}/P_{t-1} decrease, rather than increase, with share price. The return variance effect is generally positive in Figure 5, Panel B, unlike the negative values in Figure 5,

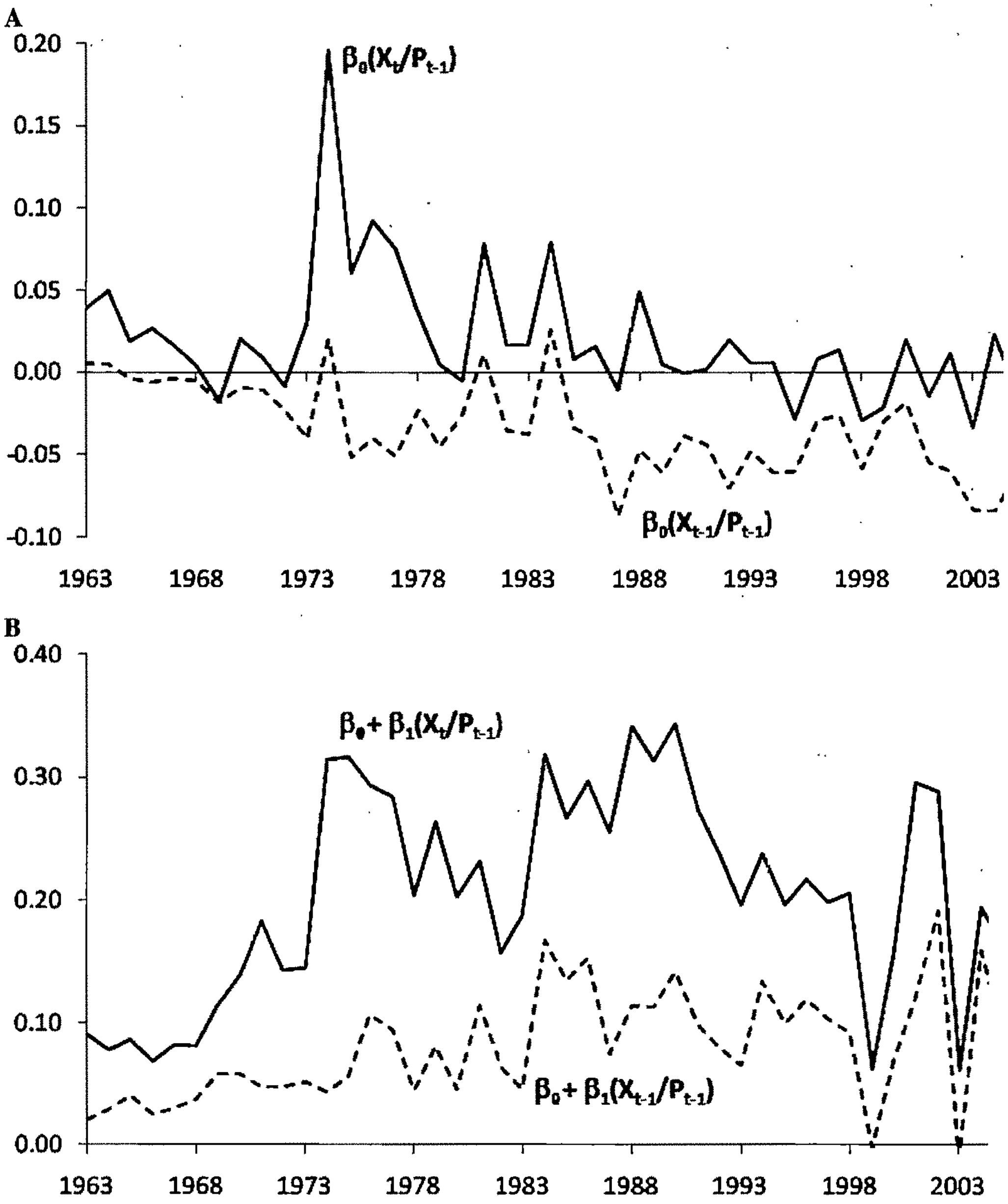
FIGURE 4

Estimates of Slopes from Annual Earnings-Returns Regressions for the Good News (β_0) and Bad News ($\beta_0 + \beta_1$) Subsamples

(124,562 Firm-Years, 1963–2006)

Panel A: Slopes of Earnings-Returns Regressions for Good News Subsamples

Panel B: Slopes of Earnings-Returns Regressions for Bad News Subsamples



(continued on next page)

FIGURE 4 (continued)

This figure provides slope estimates from annual regressions of price-deflated earnings on abnormal returns (AR_{it}): $V = a_0 + a_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + e_{it}$. V represents current earnings and lagged earnings X_{it}/P_{t-1} and X_{it-1}/P_{t-1}). Annual regressions are estimated for fiscal years ending in the same calendar year.
Variables for firm i and year t are defined as follow: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted index over the corresponding 12-month period; and D_{it} equals 1 when AR_{it} is < 0, and 0 otherwise, representing bad and good news, respectively. Additional details of all variables are provided in Appendix A.

Panel A, because the overall results in Panel B of Figure 1 suggest that mean values of AR_{it} become less negative with share price for the bad news subsample. The return variance effect in Figure 5, Panel B, is also generally smaller (larger) in the early (late) part of the sample period. That larger variation in the later years is however negatively related to the return variance effect for good news firms in Figure 5, Panel A. For example, the return variance effect is low in Panel B for 1999 and 2003, but those years exhibit high values of the return variance effect in Panel A.

The main finding from Figure 5 is that time-series variation in the loss and return variance effects for the good and bad news subsamples is reflected in corresponding time-series variation in the estimated timeliness coefficients, represented by the lines labeled $\beta_0(X_{t-1}/P_{t-1})$ and $\beta_0 + \beta_1(X_{t-1}/P_{t-1})$ in Panels A and B, respectively. Estimates of β_0 ($\beta_0 + \beta_1$) become more negative (positive) when both effects are large, as they tend to be on average later in the sample period. As indicated by the right-hand scale used for timeliness estimates, the magnitude of upward bias for the bad news subsample in Figure 5, Panel B is much larger than the upward bias in Panel A, which implies that estimates of differential timelines (β_1) are affected mainly by the bias in the bad news subsample.

Because the bias is an interactive function of the loss and return variance effects, rather than the sum, the combined effect is small if either effect is small. Although the loss and return variance effects tend to move together in Figure 5, Panel A as well as in Panel B, there are points in time when they deviate. For example, estimates of timeliness in Figure 5, Panel B exhibit little time-series variation before 1975, despite some variation in estimates of the return variance effect. We attribute this relative lack of variation in estimates of $\beta_0 + \beta_1$ to the loss effect being close to zero during that subperiod. Similarly, estimates of $\beta_0 + \beta_1$ in Figure 5, Panel B are low during 1999 and 2005 when the return variance effect is close to zero, even though the loss effect is nonzero in those years.

To be sure, increased conditional conservatism should be reflected in more frequent and bigger losses, and observing a positive relation between timeliness and the loss effect for bad news subsamples could be interpreted as *prima facie* evidence in support of the DT measure.[11] Under this alternative explanation, time-series variation in conservatism is explained by time-

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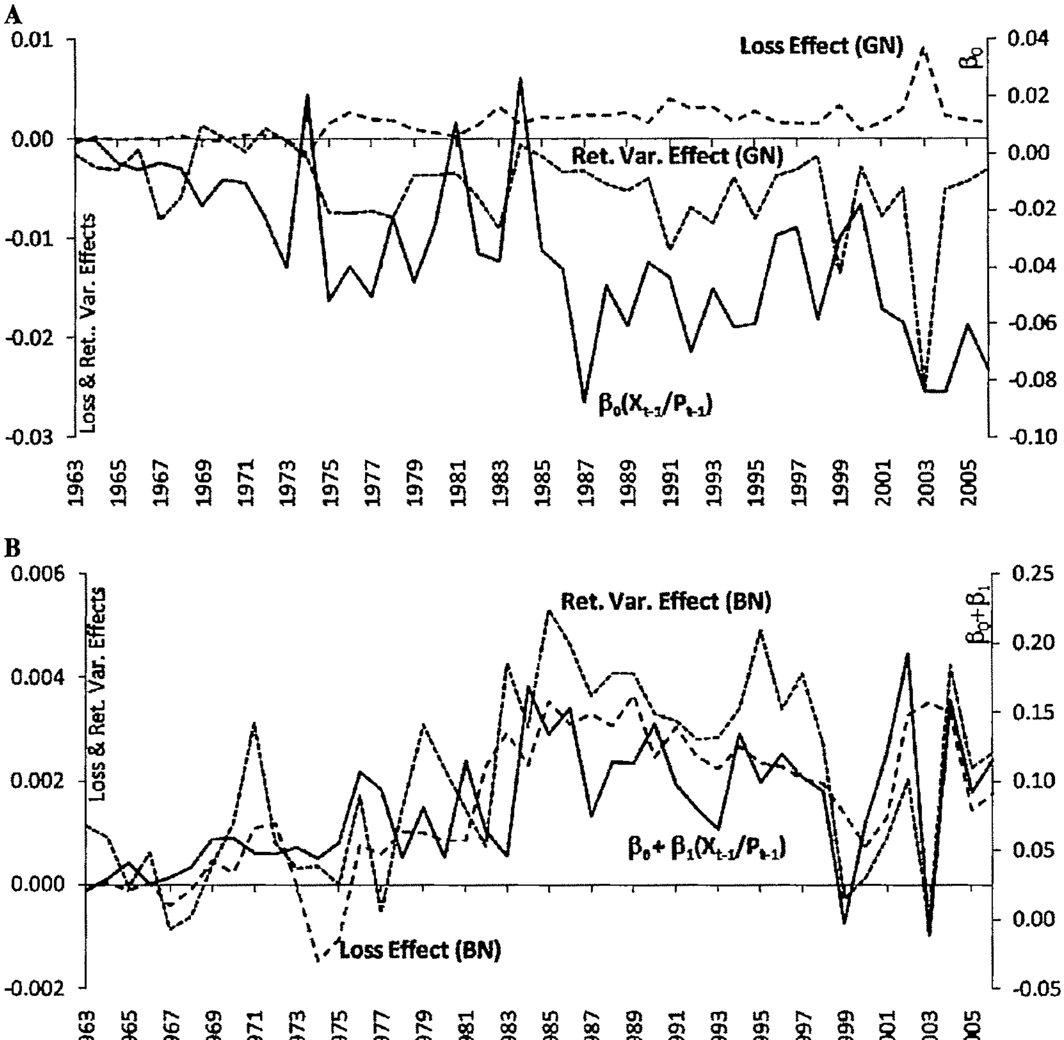
[11] For example, Givoly and Hayn (2000) posit that left skewness of the earnings distribution is consistent with conditional conservatism. Because earnings are more (less) timely for unfavorable (favorable) events, they will contain large negative items and smaller positive items that are spread over time. If so, the observed increase over time in left skewness of the earnings distribution is consistent with an increase in conditional conservatism. See also Basu (1995) and Ball et al. (2000) for the skewness/conservatism relation.

FIGURE 5
Variation in the Return Variance and Loss Effects
(124,562 Firm-Years, 1963–2006)

Panel A: Good News (GN) Subsample
Panel B: Bad News (BN) Subsample



This figure describes the impact of time-series variation in the loss and return variance effects on slope estimates from annual regressions of lagged price-deflated earnings (X_{t-1}/P_{t-1}) on abnormal returns (AR_{it}): $X_{t-1}/P_{t-1} = a_0 + a_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \varepsilon_{it}$. Annual regressions are estimated for fiscal years ending in the same calendar year. Variables for firm i and year t are defined as follow: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted index over the corresponding 12-month period; D_{it} equals 1 when AR_{it} is < 0, and 0 otherwise, representing bad and good news, respectively. The slopes for good news and bad news subsamples are represented by the estimates β_0 and $\beta_0 + \beta_1$, respectively. The loss (return variance) effect is the slope of a regression of X_{t-1}/P_{t-1} (AR_{it}) on P_{t-1}, estimated annually separately for good and bad news subsamples. Additional details of all variables are provided in Appendix A.

series variation in factors such as extant accounting rules, how accountants tend to interpret and apply them, and audit characteristics such as auditor liability regimes (e.g., Basu et al. 2001) and whether quarterly numbers are audited (e.g., Basu et al. 2002). This variation in conservatism levels is associated with corresponding variation in the fraction of loss firms, because increased conservatism results in more bad news being recognized in contemporaneous earnings. It is also possible that increased conservatism results in contemporaneous earnings being less timely for good news, which results in smaller positive values of β_0 for good news firms when conditional conservatism levels are high.

The evidence presented here is inconsistent with this alternative view. First, as shown in Figure 5, it is not the fraction of firms reporting losses or the magnitude of those losses that creates spurious evidence of conditional conservatism. Rather, it is the extent to which those two factors vary across share price, and the extent to which that variation differs across good and bad news firms. The alternative view does not suggest that conditional conservatism is related to variation across price in the probability of reporting a loss or the magnitude of those losses. Second, as shown in Figure 5, while the loss effect is necessary for biased estimates of conditional conservatism, it is not sufficient. The return variance effect is also necessary. Again, there is no link between conditional conservatism and the variation across price in return variances.

Third, there is considerable year-to-year variation in estimates of β_1 reported in Figure 3 for current earnings (X_t/P_{t-1}), especially after 1998. While we attribute this to time-series variation in the relation between return variance and price for the good and bad news subsamples, it appears inconsistent with the alternative view because the factors that determine conditional conservatism, such as auditor liability, are unlikely to exhibit so much volatility.[12] Finally, while conditional conservatism might result in good news firms reporting less timely earnings, which is associated with less positive values of β_0, it is hard to explain estimates of β_0 for current earnings in Panel A of Figure 4 that are close to zero and often negative.

Overall, the evidence is generally consistent with our thesis that time-series variation in the return variance and loss effects for bad (good) news firms causes timeliness estimates to be biased upward (downward), which in turn bias upward estimates of conditional conservatism (β_1).[13]

Explaining Cross-Sectional Variation in Conditional Conservatism

Our next set of analyses considers the correlation documented in the literature between conditional conservatism estimates (β_1) and (1) lagged book-to-market (B/M) ratios (e.g., Giner and Rees 2001; Pae et al. 2005) and (2) market value of equity (MV) or size (e.g., Giner and Rees 2001; Givoly et al. 2007). As in the time-series analyses, we compare cross-sectional variation in estimates of β_1 from current and lagged earnings (X_{it}/P_{it-1} and X_{it-1}/P_{it-1}) regressions. Observing similar patterns confirms our view that cross-sectional variation in the return variance and loss effects creates cross-sectional variation in the bias associated with DT estimates, as indicated by estimates of β_1 from lagged earnings regressions. Finding that cross-sectional variation in the bias substantially impacts observed cross-sectional variation in the DT measure (β_1 from current earnings regressions) raises doubts about inferences raised in prior research based on cross-sectional variation in the DT measure. For example, prior evidence on variation in conditional conservatism across *B/M* ratios has created some disagreement in the literature.[14] To the extent that this evidence reflects effects unrelated to conditional conservatism, there may not in fact be a controversy.

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[12] See Givoly et al. (2007, 83–89) for a discussion of the reasons why conservatism is unlikely to vary much from year to year.

[13] The strong time-series correlation between estimates of β_1 from the lagged and current earnings specification is not contingent on using share price as the deflator. Untabulated results indicate that this correlation is 0.95 when we use total assets per share as the deflator in Equation (1).

Table 4, Panel A provides the mean coefficients from annual Basu (1997) regressions, estimated separately for quintiles of lagged *B/M* ratios, calculated at the beginning of each year. We also provide results in the bottom row for all five quintiles combined, as the sample with available *B/M* data (122,411 firm-years) is slightly smaller than our full sample. Estimated values of β_1 are positively related to *B/M*, increasing monotonically from 0.096 for the lowest quintile to 0.320 for the highest quintile. These results are consistent with the findings of prior research, which suggest that low (high) *B/M* firms are associated with relatively low (high) levels of conditional conservatism.

Table 4, Panel B repeats the Basu (1997) regressions after replacing current earnings (X_t/P_{t-1}) with lagged earnings (X_{t-1}/P_{t-1}). The same monotonic trend is observed in Panel B: estimated values of β_1 increase from 0.078 for the lowest *B/M* quintile to 0.142 for the highest quintile. The levels of differential timeliness (β_1) in Panel B are closer to those in Panel A for lower *B/M* quintiles, but the gap increases for higher quintiles.

Table 5 repeats the analysis for quintiles based on size, measured by market capitalization. The number of firm-years with available data is the same as that for our full sample (124,562 firm-years). Table 5, Panel A indicates a monotonic negative relation between size and estimates of conditional conservatism (β_1) for current earnings. The results reported in Table 5, Panel B based on the X_{t-1}/P_{t-1} regressions exhibit the same monotonic negative relation. As in Table 4, the levels of estimated β_1 in Panel B are similar to those in Panel A for large firms in the high *MV* quintiles, but the gap increases as size declines.

While the cross-sectional patterns observed for lagged earnings in Tables 4 and 5 resemble the patterns observed for contemporaneous earnings, the extent of comovement is not as strong as that observed for time-series variation. We emphasize again that the results observed for lagged earnings represent a lower bound on the extent to which estimates of conditional conservatism (β_1) for current earnings are biased upward. Also, our estimates of timeliness for bad and good news for the lagged earnings regressions are likely to be biased toward zero because partitions based on *B/M* and size are correlated with X_t/P_{t-1}, the dependent variable in the lagged earnings-returns regressions. Given that β_0 is negative and $\beta_0 + \beta_1$ is positive for the lagged earnings specification, the effects that bias the timeliness estimates toward zero result in a downward bias for the conditional conservatism estimate (β_1). Overall, our evidence suggests that a substantial portion of cross-sectional variation in the DT measure is likely to be driven by cross-sectional variation in the loss and return variance effects.

Khan and Watts (2009) propose estimates of the DT measure that can vary both across firms and over time, by estimating cross-sectional versions of Equation (1) that include interaction terms, thereby allowing the coefficients to vary across firms based on *M/B* ratios, size, and leverage. Table 3 in Khan and Watts (2009) documents significantly positive (negative) interactions with β_1 for size (leverage), but an insignificant interaction for *M/B* ratios. We repeat the analysis with lagged rather than current earnings and find similar results (available upon request): while the size and leverage

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[14] Assuming that *B/M* ratios are negatively related to *unconditional* conservatism (e.g., Beaver and Ryan 2000), is it puzzling that *B/M* ratios are positively related to conditional conservatism? Some suggest that the positive relation observed between β_1 and *B/M* is due to measurement error in both earnings and returns (e.g., Givoly et al. 2007) and that error should decline as the measurement horizon increases (e.g., Roychowdhury and Watts 2007). In contrast, others (e.g., Basu 2001; Ball et al. 2010) argue that the observed positive relation is expected as a property of income recognition in accounting, and need not be due to measurement error.

TABLE 4

Relation between Book-to-Market (*B/M*) Ratio and Conditional Conservatism (122,411 Firm-Years, 1963–2006)

Panel A: Regressions of Price-Deflated Current Earnings on Abnormal Returns

Lagged *B/M* Quintile		α_0	α_1	β_0	β_1	Sample Size	Adj. R^2
1 (Lowest)	coefficient	0.042	0.007	0.007	0.096	24,466	8.77%
	t-statistic	9.07***	3.11***	1.59	9.55***		
2	coefficient	0.071	0.011	0.014	0.126	24,490	14.29%
	t-statistic	13.24***	6.48***	2.92***	11.17***		
3	coefficient	0.089	0.010	0.016	0.176	24,492	16.43%
	t-statistic	13.58***	5.46***	3.07***	11.81***		
4	coefficient	0.100	0.013	0.028	0.234	24,490	19.91%
	t-statistic	12.98***	5.66***	4.35***	12.48***		
5 (Highest)	coefficient	0.087	0.009	0.044	0.320	24,473	20.09%
	t-statistic	9.06***	2.19**	4.83***	13.39***		
Combined sample	coefficient	0.081	0.007	0.020	0.182	122,411	14.68%
	t-statistic	12.02***	3.64***	3.19***	14.25***		

Panel B: Regressions of Price-Deflated Lagged Earnings on Abnormal Returns

Lagged *B/M* Quintile		α_0	α_1	β_0	β_1	Sample Size	Adj. R^2
1 (Lowest)	coefficient	0.028	0.001	−0.028	0.078	24,466	2.25%
	t-statistic	5.73***	0.37	−4.58***	6.81***		
2	coefficient	0.065	0.001	−0.024	0.078	24,490	3.85%
	t-statistic	12.58***	0.55	−4.36***	7.62***		
3	coefficient	0.081	0.000	−0.030	0.097	24,492	3.65%
	t-statistic	12.31***	−0.10	−6.44***	8.29***		
4	coefficient	0.085	0.004	−0.022	0.108	24,490	3.07%
	t-statistic	12.52***	1.77*	−4.46***	8.67***		
5 (Highest)	coefficient	0.058	0.001	−0.046	0.142	24,473	2.32%
	t-statistic	6.05***	0.19	−5.98***	9.35***		
Combined sample	coefficient	0.066	0.001	−0.035	0.115	122,411	3.14%
	t-statistic	10.12***	0.67	−8.14***	12.36***		

---

*, **, *** Statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.
This table provides results of annual regressions of two earnings variables (*E*) on abnormal returns (AR_{it}) estimated separately for lagged book-to-market (*B/M*) quintile portfolios: $E = a_0 + a_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \varepsilon_{it}$. *B/M* equals the book value of common equity divided by the market value of equity. The *B/M* quintile portfolios are formed at the beginning of each year. The variables are derived from the following items for firm *i* in year *t*: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted market index over the 12-month period corresponding to R_{it}; and D_{it} equals 1 when the return measure is < 0, and 0 otherwise, representing bad, and good news, respectively. In Panel A (B), the dependent variable is X_{it}/P_{it-1} (X_{it-1}/P_{it-1}), or earnings in *t* (*t*−1) deflated by lagged price. Additional details of all variables are provided in Appendix A.
The annual regressions are estimated separately for firm-years with fiscal years ending in the same calendar year. The coefficients are the means of those annual coefficients and the t-statistics are derived from the time-series distributions of those coefficients.

TABLE 5

Relation between Firm Size (Market Value of Equity [*MV*]) and Conditional Conservatism (124,562 Firm-Years, 1963–2006)

Panel A: Regressions of Price-Deflated Current Earnings on Abnormal Returns

Lagged *MV* Quintile		α_0	α_1	β_0	β_1	Sample Size	Adj. R^2
1 (Lowest)	coefficient	0.076	0.002	0.029	0.238	24,896	15.98%
	t-statistic	8.13***	0.48	5.09***	14.80***		
2	coefficient	0.081	0.001	0.019	0.194	24,919	16.78%
	t-statistic	10.41***	0.33	2.57***	14.16***		
3	coefficient	0.083	0.007	0.013	0.178	24,923	15.74%
	t-statistic	11.33***	3.17***	3.01***	15.94***		
4	coefficient	0.082	0.006	0.012	0.137	24,918	13.05%
	t-statistic	14.02***	3.12***	1.63	11.33***		
5 (Highest)	coefficient	0.081	0.002	0.005	0.104	24,906	9.47%
	t-statistic	15.26***	1.25	0.75	8.97***		
Combined sample	coefficient	0.081	0.007	0.019	0.185	124,562	14.76%
	t-statistic	12.06***	3.86***	3.20***	15.33***		

Panel B: Regressions of Price-Deflated Lagged Earnings on Abnormal Returns

Lagged *MV* Quintile		α_0	α_1	β_0	β_1	Sample Size	Adj. R^2
1 (Lowest)	coefficient	0.033	0.004	−0.033	0.110	24,896	1.58%
	t-statistic	3.61***	0.88	−5.94***	8.81***		
2	coefficient	0.059	−0.001	−0.029	0.099	24,919	2.82%
	t-statistic	7.54***	−0.23	−5.70***	9.96***		
3	coefficient	0.068	0.005	−0.021	0.092	24,923	3.23%
	t-statistic	9.82***	1.97**	−5.58***	10.72***		
4	coefficient	0.076	0.001	−0.019	0.080	24,918	4.05%
	t-statistic	13.78***	0.35	−3.30***	8.93***		
5 (Highest)	coefficient	0.075	0.002	−0.015	0.069	24,906	3.97%
	t-statistic	15.00***	1.33	−2.64***	8.32***		
Combined sample	coefficient	0.066	0.002	−0.035	0.116	124,562	3.09%
	t-statistic	10.12***	0.76	−8.22***	12.66***		

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*, **, *** Statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on two-tailed tests.

This table provides results of annual regressions of two earnings variables (*E*) on abnormal returns (AR_{it}) estimated separately for lagged size (*MV*) quintile portfolios: $E = \alpha_0 + \alpha_1 D_{it} + \beta_0 AR_{it} + \beta_1 AR_{it} * D_{it} + \varepsilon_{it}$. *MV* equals the market value of equity. The *MV* quintile portfolios are formed at the beginning of each year.

The variables are derived from the following items for firm *i* in year *t*: X_{it} is earnings per share before extraordinary items; P_{it} is price per share at the fiscal year-end; R_{it} is the return from the beginning of the fourth month of the current fiscal year to the end of the third month of the next fiscal year; AR_{it} equals R_{it} minus R_{mt}, where R_{mt} is the return for the CRSP equally weighted market index over the 12-month period corresponding to R_{it}; D_{it} equals 1 when the return measure is < 0, and 0 otherwise, representing bad, and good news, respectively. In Panel A (B), the dependent variable is X_{it}/P_{it-1} (X_{it-1}/P_{it-1}), or earnings in *t* (*t*−1) deflated by lagged price. Additional details of all variables are provided in Appendix A.

The annual regressions are estimated separately for firm-years with fiscal years ending in the same calendar year. The coefficients are the means of those annual coefficients and the t-statistics are derived from the time-series distributions of those coefficients.

interactions for lagged earnings are smaller than those for current earnings, they remain statistically significant.

VII. DISCUSSION AND CONCLUSIONS

This study probes the reliability of the differential timeliness (DT) estimates of conditional conservatism proposed by Basu (1997), by replacing current earnings with lagged earnings. Because lagged earnings are reported before current news is revealed, lagged earnings cannot reflect current news, nor can lagged earnings reflect current good and bad news in a differential way. We find, however, that lagged earnings are associated with DT measures that resemble those associated with current earnings, which suggests that the DT measure from the current earnings specification is substantially biased and unreliable. Additional investigation reveals that this substantial bias can be attributed to two empirical regularities that are related to scale but are unrelated to conditional conservatism. First, scale is negatively related to return variances (return variance effect). Second, scale is negatively related to the probability of reporting a loss as well as the magnitude of the deflated loss (loss effect).

We renew the urging of Dietrich et al. (2007) and Givoly et al. (2007) that researchers avoid use of the DT measure. In particular, it is not reasonable to assume that the different sources of bias highlighted by those studies are relatively constant in cross-sectional or time-series analysis. Both loss and return variance effects vary cross-sectionally and over time, and the patterns of spurious results observed for lagged earnings resemble substantially the patterns of cross-sectional and time-series variation documented for the DT measure.

Our study illustrates the potential for biases when samples contain observations drawn from different populations associated with different underlying relations among the variables of interest. While the results are unbiased, in the sense that they reflect a weighted average of those different underlying relations, when the different sets of observations are randomly distributed, unexpected patterns can arise if the different sets of observations cluster separately. In our setting, the unexpected patterns are caused by low- (high-) price firms with lower (higher) average price-deflated earnings, the dependent variable, being more concentrated at higher (lower) absolute magnitudes of positive and negative abnormal returns, the independent variable. Similar unexpected patterns can arise in other relationships. For example, the results in Durtschi and Easton (2009) can be characterized as explaining how combining distributions of price-deflated earnings that are different for firms of different size creates unintended discontinuities around zero.

One way to identify whether such unintended biases might creep into the analysis is to replicate the methodology for samples or variables that should not be associated with the hypothesized effects. To be sure, such replications are costly, and there is no limit to the number of samples and variables that could be considered. But some effort to replicate analyses for "dummy" samples/variables seems appropriate, especially if such replications are low cost.

To focus this study on coefficient estimate biases from the Basu (1997) regression, we have elected to ignore important issues regarding the implementation of conditional conservatism (e.g., Givoly et al. 2007). For example, we do not consider expectations or the earnings level that would be reported if no news is observed. Some part of those earnings would reflect delayed recognition of good and bad news observed in prior periods, but the remainder would be a function of each firm's assets and liabilities and the level of unconditional conservatism followed by the firm.[15] Similarly, we do not consider issues relating to how accountants measure news, given that those accounting procedures should, in principle, apply to private firms for which returns are not observed. If returns proxy for news observed by accountants, then should the "no news" benchmark be zero returns (implied when good/bad news partitions are based on positive/negative returns), or should some "normal" return be expected?[16] These and other issues have been discussed extensively in prior research.[17] Our results could be influenced by refinements proposed elsewhere.

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[15] As argued in Basu (1997), ignoring the former component should not affect estimates of β_1, as it is unrelated to current news, and the latter component should be captured *on average* by the good news intercept (α_0). But a reasonable argument could be made under certain assumptions to consider expectations of "no news" earnings that are firm-year specific.

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[16] Should news be measured, for example, by the deviation of observed returns from expected returns based on specific risk factors? Basu (1995) considers returns adjusted for market model estimates of firm-specific betas, and Beaver et al. (2008) offer a more comprehensive set of adjustments.

[17] For example, Shroff et al. (2007) identify good/bad news from extreme positive/negative short-horizon returns, Also, Basu (1997) considers both returns accumulated over the fiscal year versus the 12 months between annual earnings announcements, with the choice between the two windows being determined by assumptions about how news is released and reflected in share prices. Ball and Shivakumar (2006) use accruals as the dependent variable (see also Table 2 in Basu 1997), Givoly et al. (2007) disaggregate long-horizon good and bad news into individual economic shocks, and Srivastava and Tse (2007) use changes in cash flows as the dependent variable. Finally, Callen and Segal (2008) model conditional conservatism within a return decomposition framework and derive a nonlinear relation between earnings shocks and return shocks.

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APPENDIX A

Variable Definitions and Data Sources

Variable		Description	Source
X_{it}	=	earnings per share before extraordinary items for firm i in year t;	Compustat data item 58
P_{it}	=	price per share for firm i in year t;	Compustat data item 199
LD_{it}	=	loss indicator variable equals 1 when $X_{it} < 0$, and 0 otherwise;	
$SIGN_{it}$	=	earnings sign indicator variable equals -1 when $X_{it} < 0$, and $+1$ otherwise;	
mean X_t/P_{t-1}	=	cross-sectional mean of X_{it}/P_{it-1} in year t;	

(continued on next page)

APPENDIX A (continued)

Variable		Description	Source
R_{it}	=	compounded stock return for firm i in year t, measured over the period from the beginning of the fourth month of year t to the end of the third month of year t+1;	CRSP monthly return file (msf), variable name RET
R_{mt}	=	compounded market return over the same period as R_{it}. The market index used is the CRSP equal-weighted index (includes distributions);	CRSP monthly index file (msi), variable name EWRETD
AR_{it}	=	R_{it} minus the corresponding R_{mt};	
D_{it}	=	bad news indicator variable equals 1 when $AR_{it} < 0$, and 0 otherwise, representing bad and good news, respectively. In Table 2, Panel B, AR_{it} is replaced by R_{it};	
MV_{it}	=	market value of equity for firm i in year t, which is the product of price per share and number of shares outstanding at year-end;	Product of Compustat data items 199 and 25
B/M_{it}	=	ratio of book value of equity to market value of equity for firm i in year t; and	Ratio of Compustat data item 60 to MV_{it}
TA_{it}	=	book value of total assets per share.	Ratio of Compustat data item 6 to Compustat data item 25

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Controls as Exit Barriers in Multiperiod Outsourcing Arrangements

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ABSTRACT: This study explores how initial control choice influences the ease with which outsourcing firms switch suppliers. We recognize that firms invest in controls to manage collaborative relationships, and argue that these investments generate switching costs, namely, opportunity and reinvestment costs. We collect data on outsourcing transactions by conducting semi-structured interviews across multiple field sites. Observed patterns across 53 cases show that firms with trust-based controls experience the most difficulty in switching suppliers, whereas firms with market-based controls experience the greatest ease. Firms with bureaucratic-based and hybrid controls generally lie between these extremes. Furthermore, in nearly 50 percent of our sample (25 cases), respondents indicate that the switching costs associated with control choices increase the difficulty of switching suppliers. We also find evidence that the magnitude and nature of switching costs vary with the types of controls chosen.

Keywords: *outsourcing; interfirm controls; ease of switching suppliers; transaction costs.*

Data Availability: *Data used in this study cannot be made public due to confidentiality agreements with participating firms.*

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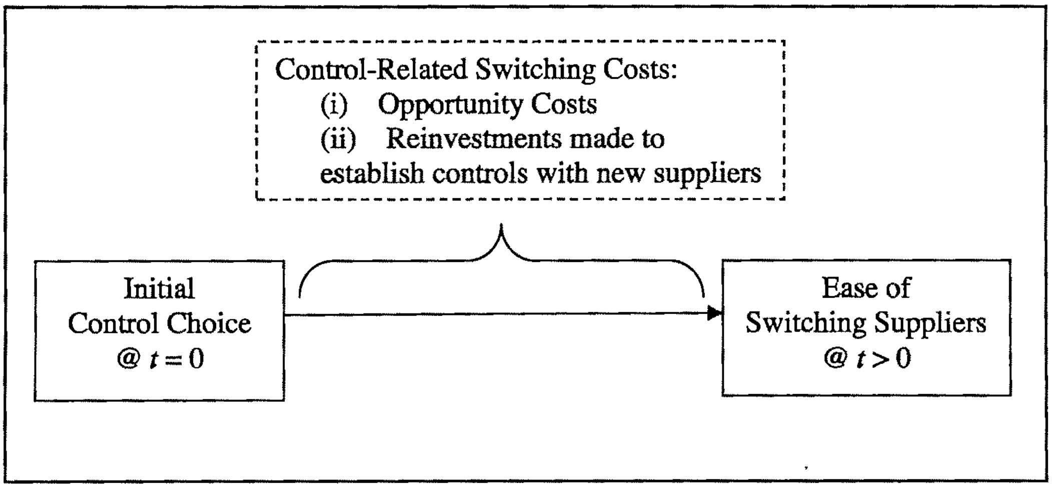
I. INTRODUCTION

There has been a significant escalation in the number of firms entering into collaborative interfirm relationships (Anderson and Sedatole 2003; McClenahen and Purdum 2005). The challenges involved in controlling activities across organizational boundaries receive considerable attention in the accounting literature (e.g., van der Meer-Kooistra and Vosselman 2000; Dekker 2004; Nicholson et al. 2006; Caglio and Ditillo 2008; Dekker 2008). This literature, however, adopts a predominantly static view of control that does not recognize explicitly that collaborative relationships evolve over multiple periods. Firms regularly review and adapt their collaborative arrangements to remain competitive (Young-Ybarra and Wiersema 1999; Ernst and Bamford 2005). Yet, little is known as to whether the investments that firms make in establishing control systems to manage interfirm relationships create impediments to subsequently modifying relationships or switching suppliers. In managing and controlling collaborative relationships, firms can invest significantly in developing trust and control infrastructure, and in ensuring that suppliers' processes meet firm requirements (Sako 1992; Dyer 1997). Because controls are generally supplier-specific, firms that switch suppliers will have to reinvest in establishing controls to manage new suppliers. We explore how initial control choice impacts the ease with which outsourcing firms[1] can switch suppliers, where switching costs are expected to vary with the investments in each control (see Figure 1).

We define control in interfirm settings as the devices, mechanisms, and processes that encourage the achievement of organizational goals by influencing behavior (Speklé 2001). We classify control choices based on a typology commonly used in the accounting literature—market-based, bureaucratic-based, and trust-based controls (van der Meer-Kooistra and Vosselman 2000; Caglio and Ditillo 2008). Instead of focusing narrowly on specific control mechanisms such as contracts, this typology provides a comprehensive coverage of distinct groups of control

FIGURE 1
The Relation between Initial Control Choice and Ease of Switching Suppliers


Control-Related Switching Costs:
(i) Opportunity Costs
(ii) Reinvestments made to establish controls with new suppliers
Initial Control Choice @ $t=0$
Ease of Switching Suppliers @ $t>0$

┆ Mechanism that underlies the relation.

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[1] Outsourcing firms refer to firms that have contracted out products or services to external suppliers.

mechanisms and devices adopted to manage interfirm relationships. We are interested in the ease of supplier switching associated with each type of control chosen, drawing on Williamson's (1996, 1998) transaction cost economics (TCE) framework to study this relation. Williamson (1996, 1998) recognizes that extant governance structures can impede firms from achieving optimal governance structures by giving rise to switching costs. We expect extant controls to generate two types of costs associated with switching suppliers ("control-related switching costs"): (1) opportunity costs arising from benefits forgone when discarding existing controls, and (2) reinvestment costs to establish controls to manage new suppliers. *Ceteris paribus*, controls that give rise to the highest switching costs should be associated with the lowest ease of switching suppliers.

Studies that examine control phenomena in interfirm settings are generally in-depth case studies of distinct groups of control mechanisms and practices (e.g., van der Meer-Kooistra and Vosselman 2000; Langfield-Smith and Smith 2003; Donada and Nogatchewsky 2006), or large sample survey studies that focus on specific control mechanisms (e.g., Dekker 2004; Anderson and Dekker 2005; Dekker 2008). We adopt the multiple case study method and test our hypothesis using data collected from 53 outsourcing arrangements. We select the multiple case study method for several reasons. First, the collection of rich data via semi-structured interviews allows us to measure and refine complex constructs that are not well operationalized in extant research (Eisenhardt 1991; Lillis and Mundy 2005). Second, this method supports the refinement of theory relating to the association between key variables (Lillis and Mundy 2005). By focusing on a narrow domain of interest, specifically initial control choice and the ease of switching suppliers, we are able to exploit evidence of cross-sectional patterns across a reasonable number of observations. This allows the achievement of more cross-sectional breadth than is evident in in-depth case studies, while allowing for the collection of richer data than the survey method.

As hypothesized, observed patterns across 53 cases show that firms with trust-based controls experience the most difficulty in switching suppliers; firms with market-based controls experience the greatest ease; and firms with bureaucratic-based controls and hybrid controls lie between these extremes. We allow respondents to provide reasons for the ease of switching suppliers. Respondents in nearly 50 percent of our sample (25 cases) reveal that their firms experience difficulty in switching suppliers because of control-related switching costs. Given the substantial investments made in developing trust, firms with trust-based controls generally incur high control-related switching costs, which include high opportunity costs associated with forgone reductions of monitoring costs. These firms also need to reinvest heavily in establishing trust-based controls with a new supplier. Conversely, firms with market/bureaucratic-based controls generally incur low opportunity costs and reinvestment costs.

This study makes the following contributions. First, we add to the management accounting and strategic alliance literature that examines post-formation phenomena in inter-organizational relationships (e.g., Langfield-Smith and Smith 2003; de Rond and Bouchikhi 2004; Mouritsen and Thrane 2006; Kamminga and van der Meer-Kooistra 2007). While some studies examine the evolution of controls or governance structures over time, we investigate how initial control choice influences the ease of switching suppliers in subsequent periods. Our results reflect the strategic consequences that flow from initial control choice. Second, this study attempts to overcome criticisms relating to static applications of TCE by looking beyond the determinants of control choice. Following Williamson's (1996, 1998) argument that switching costs are incurred when firms discard extant governance forms and adopt new alternatives, we investigate whether existing controls also generate switching costs and add to the difficulty of switching suppliers. We find evidence of control-related switching costs, which supports his argument, and we extend prior literature by showing that the *magnitude* of switching costs varies with the type of control selected.

Third, ours is one of the first studies to explore how the magnitude and nature of transaction costs in the form of investment in controls vary with the type of controls chosen. We recognize that most transaction costs incurred in setting up controls to manage suppliers are investment in nature, including costs relating to supplier search and selection, trust-building, and developing control infrastructure (Arrow 1974; Sako 1992; Dyer 1997). Investments in trust-building are particularly important in assessing the magnitude of opportunity costs and reinvestment costs when firms consider switching suppliers. We provide empirical evidence of trust-building costs, which have largely been ignored in prior literature, and extend extant knowledge of the transaction costs incurred by firms that adopt trust-based controls to manage their suppliers *vis-à-vis* firms that adopt other more formal types of controls.

Section II provides the theoretical framework and hypothesis to be tested. Section III discusses the research method. Section IV describes the clusters that result from classifying cases based on control choices and ease of switching suppliers. Section V presents the results, and Section VI concludes.

II. THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Williamson's (1985) TCE framework provides the theoretical basis for much of the research on control choices in collaborative relationships (e.g., van der Meer-Kooistra and Vosselman 2000; Dekker 2004; Nicholson et al. 2006; Dekker 2008). TCE proposes that forms of governance are adopted to minimize the sum of production and transaction costs. Transaction costs are non-production-related costs that arise when any form of exchange is taking place in an economic system that is not frictionless. Examples of transaction costs include: (1) supplier search costs to identify and select suppliers; (2) contracting costs to negotiate and write contracts; (3) transition costs to oversee the transfer of operations and assess supplier processes prior to contract execution (Kakouris 2006; Ghodeswar and Vaidyanathan 2008); (4) monitoring and enforcement costs to ascertain compliance with contractual obligations and to sanction noncompliant behavior; (5) adjustment costs to correct for any subsequent misalignment; and (6) costs to build and maintain trust (Williamson 1985; Sako 1992; Dyer 1997).

Williamson (1996, 1998) argues that, when switching costs incurred to establish alternative governance structures are high, it may be more efficient for firms to continue to use extant governance structures that are not optimal (i.e., do not *a priori* minimize transaction costs). By recognizing that firms incur switching costs when adopting new governance structures, Williamson (1996, 1998) explains how extant governance structures can impede change. We apply his rationale in studying whether, and how, initial controls selected to manage suppliers affect supplier switching.

Control Choices in Interfirm Relationships

We classify control choices based on van der Meer-Kooistra and Vosselman's (2000) typology, namely, market-based controls, bureaucratic-based controls, and trust-based controls. *Market-based controls* are governed by market forces (Ouchi 1979; van der Meer-Kooistra and Vosselman 2000; Speklé 2001). Suppliers self-regulate as the threat of being replaced by another supplier is real. The relationship is managed through simple processes and limited control mechanisms. For example, suppliers are selected via a competitive bidding process; standard contracts are negotiated and written; and transactions are periodically monitored.

Bureaucratic-based controls are characterized as "systems of surveillance, evaluation, and direction" (van der Meer-Kooistra and Vosselman 2000, 59). They include the set of rules specifying procedures and standards associated with desired behavior and output (Ouchi 1979), and are far more extensive than market-based controls. Firms adopting bureaucratic-based controls select their suppliers based on pre-set standards and rules, and negotiate and write very detailed contracts (Ouchi 1979; van der Meer-Kooistra and Vosselman 2000; Dekker 2004). When transferring operations, they monitor the set-up process, supplier processes, and output (Kakouris 2006). These control mechanisms and practices can potentially reduce monitoring requirements during contract execution by providing some assurance about supplier competence. However, they cannot ensure supplier compliance. Therefore, relatively high levels of monitoring are still needed to evaluate supplier performance and ensure contract conformance. Examples of control mechanisms adopted during contract execution include behavior controls (e.g., standard operating procedures) and output controls (e.g., performance measurement systems) (Dekker 2008).

Trust-based controls are characterized by some reliance on trust as a form of control (van der Meer-Kooistra and Vosselman 2000). We define trust as the willingness of firms to be vulnerable to their transacting partners based on positive expectations of the partners' intentions (i.e., goodwill trust) or performance (i.e., competence and contractual trust) (Rousseau et al. 1998; van der Meer-Kooistra and Vosselman 2000). Following Adler (2001), we view trust as a deliberate choice that involves investing in trust-building activities. These activities include selecting trustworthy suppliers, training to instill the right values in suppliers' employees, managing and assisting the transition, and intensive communication and interaction that relates to "joint goal setting, problem solving, decision making, and partner development activities" (Dekker 2004, 33). Trust also develops over repeated transactions as familiarity increases and when suppliers consistently meet performance targets (Rousseau et al. 1998; Tomkins 2001). Relatively low levels of monitoring and enforcement are expected in the presence of trust as: (1) high levels of trust will motivate both parties to act in each other's best interest; and (2) the desire to maintain a trusting relationship will prevent the firm from signaling distrust of their partner via high levels of monitoring (Dekker 2004). Reliance on trust is also reflected by (1) the absence of contracts, or (2) having contracts with general guidelines and fewer or less detailed benchmarks, contingencies, or safeguards (van der Meer-Kooistra and Vosselman 2000; Donada and Nogatchewsky 2006).

The Influence of Initial Control Choice on the Ease of Switching Suppliers

We hypothesize that the type of control initially chosen will influence the ease of switching suppliers. We recognize that firms initially invest in different types of controls, and argue that the level of investment varies with control type. Investments in controls are broadly defined in this study as costs incurred to facilitate the monitoring of contract execution and reduce subsequent monitoring and enforcement costs.[2] Most transaction costs incurred by firms to manage suppliers prior to contract execution are therefore defined as investment-oriented in nature, including costs involved in searching for a competent or trustworthy supplier, monitoring of the transition process, and developing control infrastructure and trust. We expect investments, which give rise to future economic benefits by lowering monitoring and enforcement costs, to generate switching costs.

There are two main types of control-related switching costs: (1) benefits forgone when discarding existing controls (i.e., opportunity costs), and (2) reinvestments made to establish controls to manage new suppliers (i.e., reinvestments cost). Opportunity costs refer to the loss of future benefits in the form of lower monitoring and enforcement costs. These costs will vary with control choice. Each type of control is associated with different levels of investments and, hence, is expected to give rise to different opportunities for savings in monitoring and enforcement costs. Reinvestment costs are similar in nature to the investment costs that were initially incurred to set up controls to manage incumbent suppliers. Thus, they also vary with control type. Firms can avoid reinvesting in controls to manage new suppliers by not switching suppliers.

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[2] We adopt a broader definition of investment in controls than Sako (1992) and Dyer (1997). They require investments in controls to reduce monitoring costs, while our definition also includes the set up of infrastructure that allows the monitoring of contract execution.

Firms that adopt *market-based controls* make the lowest investment in controls. They incur lower supplier search and contracting costs than firms that adopt other control types. Given that little or no investments were made to build trust, firms will incur little if any opportunity costs relating to forfeited reductions in monitoring and enforcement costs if they discard existing controls when switching suppliers. These firms will also incur low reinvestment costs when establishing market-based controls with new suppliers. Since control-related switching costs are low, we expect firms with existing market-based controls to be able to switch suppliers with relative ease.

At the opposite end of the spectrum, firms adopting *trust-based controls* invest most heavily in establishing controls. They incur very high supplier search and trust-building costs, and moderate to high contracting costs (Sako 1992; Das and Teng 2001). Most trust-building costs are incurred prior to contract execution, and in some cases several years prior. Given the large investments in controls, firms that discard trust-based controls to switch suppliers will incur the highest opportunity costs in terms of forfeited reductions in monitoring and enforcement costs. In addition, firms need to incur high reinvestment costs to establish trust-based controls with new suppliers. Since opportunity and reinvestment costs are both high, we expect the ease of switching suppliers to be low.

Finally, the investments made by firms to establish *bureaucratic-based controls* are higher than firms that adopt market-based controls but lower than firms that adopt trust-based controls. These firms incur higher supplier search and contracting costs than firms that adopt market-based controls. They also incur substantially lower supplier search costs and practically no trust-building costs relative to firms that adopt trust-based controls. We argue that, while some investments in bureaucratic-based controls reduce subsequent monitoring and enforcement costs (e.g., costs of assessing supplier processes and incorporating safeguards in contracts), other investments merely facilitate monitoring (e.g., costs of developing a reporting infrastructure and standard operating procedures). Hence, these firms are expected to incur some opportunity costs and reinvestment costs when discarding extant controls and adopting new controls, respectively. Since control-related switching costs for firms with bureaucratic-based controls will be higher than market-based controls but lower than trust-based controls, we expect the ease of switching suppliers to be highest for firms that adopt market-based controls and lowest for firms that adopt trust-based controls, with firms that adopt bureaucratic-based controls falling somewhere in between. This gives rise to the following hypothesis[3] (see Figure 2 for a diagrammatic summary):

Hypothesis: The ease of switching suppliers is the lowest when trust-based controls are in place, followed by bureaucratic-based controls, and, finally, market-based controls.

Other Explanatory Variables

We collect information on four other explanatory variables that potentially influence the ease of switching suppliers, namely, asset specificity, power asymmetry, existing ties, and prior experience. Our analysis allows us to distinguish the effects of initial control choice from the effect of these other variables on the ease of switching suppliers. *Asset specificity* is defined as investments in transaction-specific assets that have a lower value when redeployed for alternative purposes (Williamson 1985). Firms incur high opportunity costs when they use transaction-specific assets for

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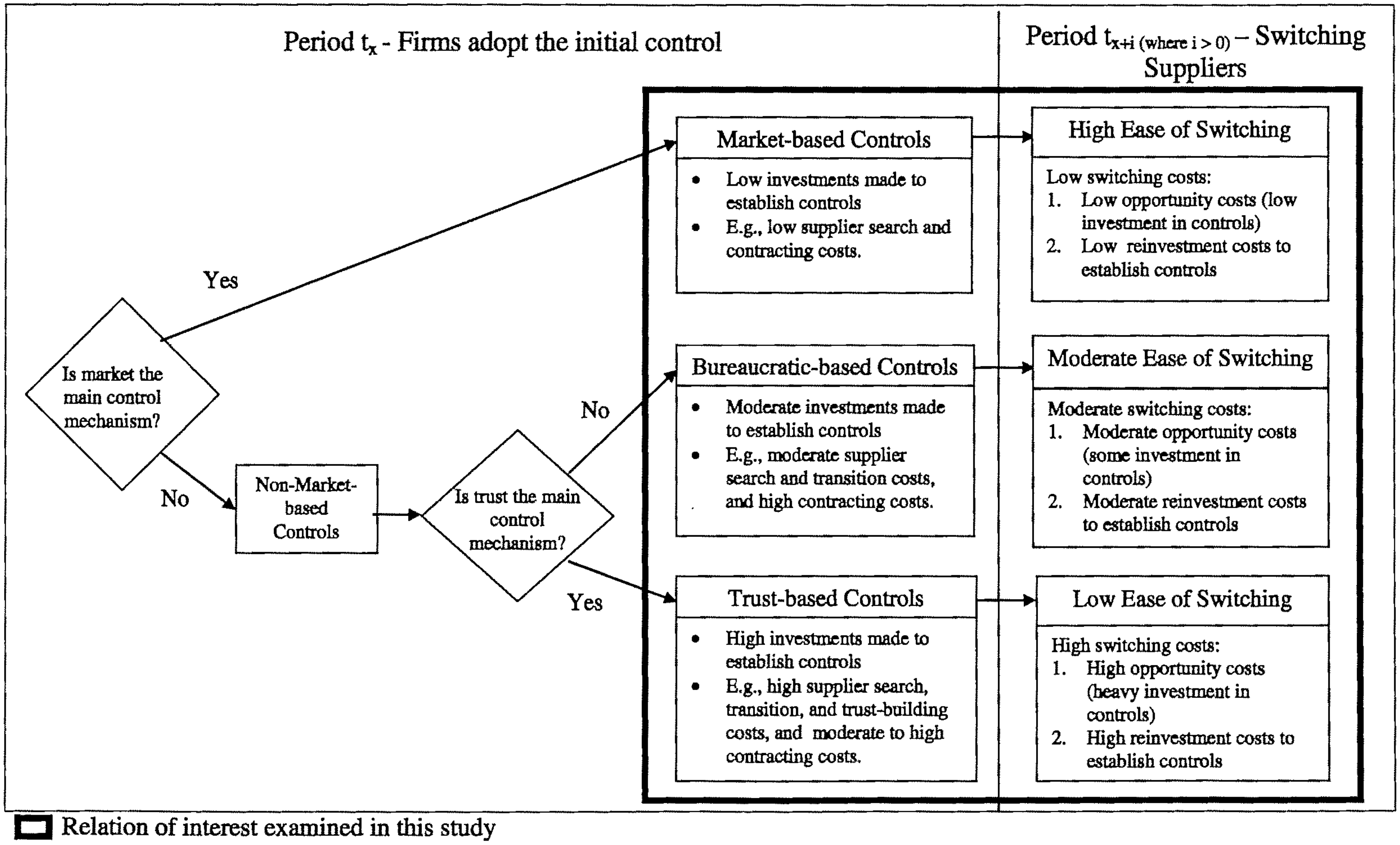
[3] This hypothesis is developed based on the simplifying assumption that the same type of control is chosen to manage both the incumbent and new suppliers. If the firm adopts a different type of control to manage new suppliers, then the predictions will become more complex. Nonetheless, we expect the ease of switching suppliers to still remain a function of control-related switching costs in both scenarios; and the multiple case method adopted will allow us to capture more complex scenarios.

FIGURE 2
Theoretical Framework


Period t_x - Firms adopt the initial control
Period t_{x+i} (where i > 0) – Switching Suppliers
Is market the main control mechanism?
Yes
No
Non-Market-based Controls
Is trust the main control mechanism?
No
Yes
Market-based Controls
• Low investments made to establish controls
• E.g., low supplier search and contracting costs.
Bureaucratic-based Controls
• Moderate investments made to establish controls
• E.g., moderate supplier search and transition costs, and high contracting costs.
Trust-based Controls
• High investments made to establish controls
• E.g., high supplier search, transition, and trust-building costs, and moderate to high contracting costs.
High Ease of Switching
Low switching costs:
1. Low opportunity costs (low investment in controls)
2. Low reinvestment costs to establish controls
Moderate Ease of Switching
Moderate switching costs:
1. Moderate opportunity costs (some investment in controls)
2. Moderate reinvestment costs to establish controls
Low Ease of Switching
High switching costs:
1. High opportunity costs (heavy investment in controls)
2. High reinvestment costs to establish controls
▭ Relation of interest examined in this study

different purposes or with different suppliers. Therefore, where asset specificity is high, the firms tend to be locked into existing interfirm relationships and the ease of switching suppliers is very low (see Young-Ybarra and Wiersema 1999).

Power is defined as the ability of a firm to influence decision variables of their transacting partner (Provan 1980; Frazier 1983). Our focus is on perceived power differences (i.e., *power asymmetry*) between transacting parties (Anderson and Dekker 2005). The less-powerful party will be subject to the intentions of the more-powerful party (Young-Ybarra and Wiersema 1999). Since suppliers would generally prefer to sell more to the outsourcing firm and retain its business, the ease of switching to a new supplier will increase with the power of the outsourcing firm.

The *number of existing ties* is represented by the number of contracts between two transacting parties. When transacting parties have multiple contracts with each other, the failure of one contractual arrangement can negatively impact, or even threaten, the entire relationship (Young-Ybarra and Wiersema 1999). Thus, we expect a negative relation between the number of existing ties and the ease of switching suppliers.

Prior experience refers to the firm's experience in: (1) forming and managing similar strategic alliances ("alliance experience"); and (2) transacting with the same supplier ("partner experience") (Reuer et al. 2002). Similar alliance experiences enhance the firm's ability to anticipate situations in which supplier switching is considered and allow steps to be taken to facilitate the change, while the trust that is likely to develop over time with positive partner experience is likely to reduce the ease of switching suppliers.

III. METHOD

Sample Selection and Data Collection

We adopt the multiple case study method in this study. The unit of analysis is each outsourcing arrangement. Given that our aim is not statistical but theoretical generalizability, we adopt purposive sampling to maximize variation in the test variables (Arnold 1970; Lillis 2002). We focus on outsourcing firms that are likely to have switched suppliers or considered switching suppliers, and apply two main criteria in selecting our sample. First, we select firms that have outsourced different types of activities. TCE predicts that transactions with different characteristics will be associated with different control choices (i.e., independent variable); and we expect the ease of switching suppliers (i.e., dependent variable) to vary with control choice. Second, because managers are less likely to announce their intentions or actions with regard to supplier switching, we select firms that entered into outsourcing arrangements two to six years prior to data collection. These firms are more likely to adjust their outsourcing arrangements as compared to firms in stable and long-term relationships (Reuer et al. 2002). This allows us to balance between (1) allowing sufficient passage of time to enable managers to reflect on the outsourcing decisions, and (2) minimizing the recall and hindsight biases often associated with retrospective data collection that we adopt (see Doz 1996).[4]

We conducted a keyword search (outsourc*) in the DatAnalysis and *Business Review Weekly* databases[5] to identify our sample (see Steensma and Corley 2001). Two informants who work for large outsourcing providers provided us with the remaining sample. We extracted company information and contact details from *The Business Who's Who of Australia* and *Kompass Australia*. Companies not listed in either source were eliminated. To initiate contact, we sent a pre-notice letter to the CFO of identified firms to explain the objective of the study (Dillman 2000), followed shortly by a telephone call to confirm the firm's involvement in outsourcing and arrange an interview with the CFO or a nominee.

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[4] There is no rule of thumb for identifying timeframes within which the recall bias is acceptable. In the strategic alliance literature, timeframes range from a five-year period for survey studies (e.g., Sako 1992; Schilling and Steensma 2002) to a decade for in-depth case studies (e.g., Doz 1996).

[5] DatAnalysis is an Australian database that captures information from annual reports, announcements, and other available Australian Stock Exchange information for all currently, and some formerly, listed companies. The *Business Review Weekly* is the leading weekly business magazine in Australia.

We carried out 36 semi-structured interviews with outsourcing managers or managers knowledgeable about outsourcing.[6] The response rate is 63 percent, with acceptances from managers in 34 firms and refusals from managers in 20 firms.[7] Each interview lasted approximately 80 minutes, and the respondents discussed on average two outsourcing arrangements. To enhance the completeness and integrity of data collected, we (1) used a pre-tested interview guide; (2) audio-recorded all interviews after providing assurances of confidentiality; (3) checked transcripts for accuracy; and (4) asked participants to focus on outsourced activities with which they were most familiar, to refer the interviewer to their colleagues, and to use documents to jog their memory (Miles and Huberman 1994; Minichiello et al. 1995; Yin 2003).

The final sample comprises 53 outsourcing cases from 29 firms located across Australia. All but two firms are from the manufacturing industry. The sample includes some firms that are listed in Australia ($n = 6$), and some subsidiaries of companies listed in Australia ($n = 2$) and overseas ($n = 12$). Table 1 presents a summary of the activities outsourced in this sample of firms. Appendix A provides further information about companies in the sample and participant managers.

TABLE 1
Summary of Outsourced Activities

Types of Activities[a]	No. of Cases
Manufacturing	15
Logistics[b]	13
Information Technology	10
Maintenance	5
Miscellaneous[c]	10
Total	53

[a] In nine cases, the activity has been outsourced for the first time; the activity in 23 cases was only outsourced a few times; and the remaining 21 cases relate to situations where the activity has been outsourced for a long time, although suppliers have been changed or contracts renewed.

[b] The outsourced activities in this category include warehousing, transportation, and/or the management of either or both.

[c] The outsourced activities in this category include labor (casual and other), research and development, training, project engineering, and packaging.

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[6] We conducted 41 interviews, but discarded five that were incomplete or contained potential errors. Reasons for the exclusion include relatively inexperienced (generally new) staff or managers, and a telephone interview that resulted in poor-quality recording.

[7] We count the contact made with each group of companies only once, ignoring the number of firms contacted, as the group may outsource to the same supplier or a single contact number may be provided for the group. We exclude companies that (1) do not engage, or have little involvement, in outsourcing ($n = 10$), and (2) do not meet our selection criteria ($n = 3$). We also exclude 15 firms that we stopped following up on once we deemed that the sample size was sufficient due to time constraints.

Data Analysis

To mitigate researcher bias, we adopt a systematic and auditable data analysis process, and maintain an audit trail from the interview transcript to the results documented. In the first stage of the analysis, we use a qualitative analysis software, NVivo 2, to code information that relates to each variable across all cases (Miles and Huberman 1994; Yin 2003; Lillis and Mundy 2005). We integrate *a priori* and inductive approaches to develop a coding protocol. The initial set of codes derived from prior literature are subsequently revised and refined, and new codes are added as dictated by the data.[8] Appendix B contains codes and definitions.

In the second stage, we adopt a combination of case-oriented and variable-oriented approaches in analyzing the coded data (Eisenhardt 1989; Miles and Huberman 1994). As part of the analysis, we use matrices to display data in order to systematize and focus the organization of the data, and to enhance completeness of the analysis. We apply decision rules, derived from the literature, to coded text to obtain a relatively standard set of variables for each case (e.g., ease of supplier switching and control choice). To enhance construct validity, we stack all cases in ascending order based on the magnitude (e.g., low, medium, and high) or the dimensions (e.g., market-based, bureaucratic-based, and trust-based controls) of each variable to refine decision rules and ensure consistent application across all cases.

Next, we examine relations between dependent and independent variables within-cases and, subsequently, across-cases. We create categorical variables from our qualitative data (e.g., the ease of switching suppliers variable is a categorical variable with low = 1, moderate = 2, and high = 3). This enables us to conduct nonparametric tests to provide statistical results for our predicted relations. There is a further requirement to isolate the unique contribution of control choices *vis-à-vis* other variables in explaining the ease of switching suppliers. Specifically, we need to distinguish control-related switching costs from switching costs attributable to other factors. We carefully review the transcripts to identify cases in which respondents indicate a direct link between control-related switching costs and the ease of switching suppliers. A summary of cross-case findings that result from this analysis is presented in the following section.

IV. FINDINGS I: CLASSIFICATION OF CASES

Grouping by Control Choices

We first identify the type of controls chosen by firms in our sample. We develop questions to capture information about the control mechanisms and practices that relate to supplier selection, contracting, transitioning, and the monitoring of contract execution. Respondents were also given descriptions of three types of controls derived from van der Meer-Kooistra and Vosselman's (2000) typology, asked to select the description that best fit their firm, and to comment on differences observed.

We apply decision rules derived from the typology and classify the control choice for each outsourcing transaction. Figure 3 presents the resulting control profile of the sample—five cases adopt market-based controls, seven cases adopt bureaucratic-based controls, and 28 cases adopt

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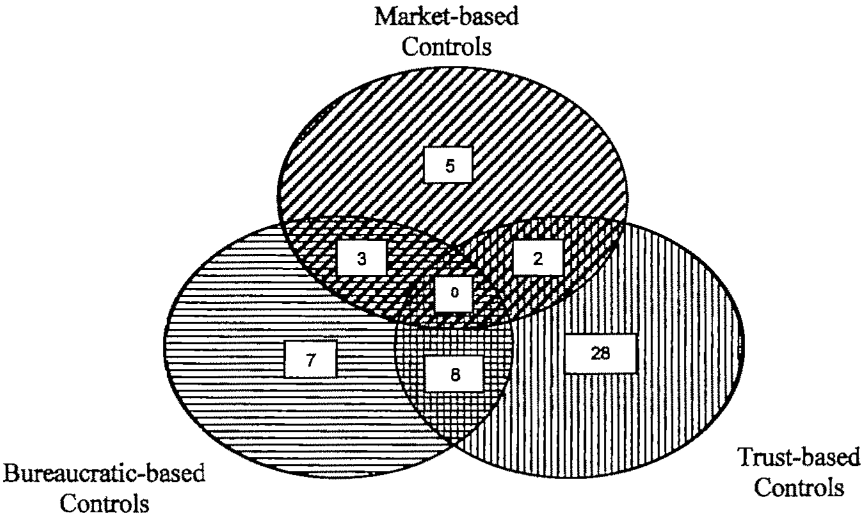
[8] The coding is performed by one researcher. Intra- and inter-coder agreement checks were performed for one transcript to refine the codes. A transcript was coded by the same researcher on two separate occasions and the discrepancies resolved. A third coding was performed to ensure intra-coder agreement. To ensure inter-coder agreement, an independent coder with no prior knowledge of the subject area was provided with a copy of the coding scheme and an uncoded transcript. After the coding process was completed, the results for both coders were compared and the differences observed were discussed. At the end of the discussion, an agreement on the definitions of all codes was reached.

FIGURE 3
Summary of the Control Profile for 53 Cases



trust-based controls. The remaining 13 cases adopt hybrids of controls that resemble more than one control type (Håkansson and Lind 2004; Donada and Nogatchewsky 2006). We accordingly classify them as market/bureaucratic-based (n = 2), market/trust-based (n = 3), and bureaucratic/trust-based controls (n = 8). Appendix C presents an example of a case classified under each control type to demonstrate the application of the decision rules.

Consistent with prior studies (see Caglio and Ditillo 2008), we observe that control mechanisms are far more extensive for bureaucratic-based controls than market-based controls. Firms adopting bureaucratic-based controls undertake tender processes, verify supplier competence, write detailed contracts, and have higher levels of monitoring such as regular supplier reporting and auditing. Some firms also conduct tests to validate suppliers' product, equipment, and processes when transferring operations to ensure supplier competence and compliance with firm requirements. In contrast, four firms with market-based controls do not have contracts; monitoring is generally limited to employee feedback and the review of a few outcome performance measures.

We observe that some firms that adopt trust-based controls (n = 15) invest significantly in developing trust with suppliers, while others (n = 13) appear to have already developed trust from similar past transactions with the supplier. In addition, while the contracts and monitoring mechanisms in trust-based control cases are generally less extensive than those characterizing bureaucratic-based control cases, they are more extensive than predicted. For example, detailed contracts that resemble those in bureaucratic-based cases were observed in two-thirds of the cases (n = 21); formal controls, such as occasional audits and monitoring procedures, were observed in some cases. Nonetheless, the main distinguishing feature of trust-based controls is the use of control mechanisms for collaborative purposes instead of merely preventing opportunistic behavior (Vosselman and van der Meer-Kooilstra 2009). For example, detailed contracts form the basis for building collaborative relationships by promoting understanding. Nonpunitive functions of control mechanisms during contract execution include the timely resolution of problems to improve both partners' performance, discharge of management responsibilities; and coordination of tasks (Gulati and Singh 1998; Dekker 2004). When transferring operations, some firms also monitor their suppliers' set up processes in order to provide necessary guidance, and establish trust by deploying key employees to foster good relationships. Many respondents are also confident of their suppliers' performance, adopt a "no blame" policy,[9] and some respondents believe their suppliers would always act in the best interest of the respondents' firms.

We further collect information about transaction costs in the form of the time and resources expended by the firms in establishing each control, and in exercising the control to monitor contract execution (Dyer and Chu 2003; Nicholson et al. 2006). The time taken for supplier selection and contracting is, on average, the shortest for market-based control cases (i.e., a few hours to two months), followed by bureaucratic-based control cases (i.e., between two to eight months, averaging four to five months), and then trust-based control cases (i.e., an intensive three-month period to one year, averaging seven months). Overall, the mainly qualitative evidence of the time and effort expended by firms with different control choices indicates that such investments in controls are lowest when firms adopt market-based controls, followed by bureaucratic-based controls, and then trust-based controls. We further observe evidence of high initial trust-building costs, and the subsequent reduction in levels of monitoring and enforcement. These observations indicate that investments in trust-based controls are the highest, which has implications for the magnitude of opportunity and reinvestment costs. In summary, the evidence shows that the magnitude and nature of transaction costs incurred by firms vary with control choice, providing some indication that switching costs will also vary with control choice.

Ranking by Ease of Switching Suppliers

In order to assess the ease of switching suppliers, we developed questions to capture information about the process of exiting the relationship and switching suppliers, the difficulties faced, and the outcomes experienced (Young-Ybarra and Wiersema 1999). We apply decision rules and classify cases in high ($n = 12$), moderate ($n = 5$), and low ($n = 36$) categories depending on: (1) the explicit verbalization about how easily firms are able to switch suppliers; and (2) evidence of the amount of time or effort that was expended in resolving issues with the incumbent supplier and switching suppliers. Firms in the high-ease category expend very little time or effort in switching suppliers. For example, firms in two cases did not have any problems exiting the relationship. They successfully returned the products and demanded full refunds from their incumbent suppliers. In contrast, firms in the low-ease category expended a lot of time, effort, and resources in the process, and tried very hard to first resolve issues with their incumbent supplier. For example, managers in four cases were determined to make the outsourcing arrangements work, as switching suppliers was not viewed as a feasible option ($n = 4$).

Table 2 presents a summary of the cases classified by ease of switching suppliers. Note there are only seven cases in which firms switched suppliers. Since switching costs arise from initial control choice as well as other explanatory variables (e.g., asset specificity and power asymmetry), it is unlikely that the majority of firms engaged in collaborative partnerships will routinely switch suppliers. The strongest evidence of high switching costs is found in cases in which firms decide against switching suppliers. Thus, it is important to explore qualitative evidence of ease of switching suppliers, not only for firms that switch suppliers, but also for those that contemplate switching but do not switch, and those where the issue of switching is largely hypothetical. It is also possible that the small number of firms that switched suppliers reflects some degree of selection bias, as respondents could have chosen to avoid discussing failed collaborations. This bias is unlikely to dominate the sample, given the range of factors that increase the difficulty of switching and the fact that respondents discussed control-related switching costs without directed questions.

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[9] In contrast, suppliers in some bureaucratic-based control cases have to submit noncompliance reports.

TABLE 2

Summary of Cases Ranked According to the Ease of Switching Suppliers

Ease of Switching Suppliers	**Number of Cases (Number of Cases that Switch Suppliers)**	
High (i.e., easy)	12 (2)	23%
Moderate	5 (1)	9%
Low (i.e., difficult)	36 (4)	68%
Total	53 (7)	100%

V. FINDINGS II: CROSS-CASE RESULTS AND DISCUSSION

Exploring the Influence of Control Choice on the Ease of Switching Suppliers

In this section, we explore evidence of a relation between initial control choice and subsequent ease of switching suppliers. Table 3, Panel A presents a summary of the association between the types of controls initially chosen and the ease of switching suppliers. Observed patterns in Panel A show how the proportion of cases across the three categories of ease of switching suppliers changes with the types of controls. In particular, we can easily see how the proportion of cases in the *Low* column of each control category increases as we move from market-based controls (0 out of 5) down to trust-based controls (23 out of 28). The differences between the groups are significant (Pearson Chi-square statistic $= 16.801$; $p = 0.002$; and Mantel-Haenszel [hereafter, MH] Chi-square statistic $= 14.304$; $p < 0.001$).[10] Furthermore, the results of the Jonckheere-Terpstra (hereafter, JT) test (standardized statistic $= -3.241$; $p = 0.001$) and additional sensitivity analyses[11]

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[10] All nonparametric tests and correlations are one-tailed. We exclude market/trust-based control (*MCTC*) cases when performing all nonparametric tests to obtain ordered categories of initial control choice, as we cannot predict whether the ease of switching suppliers associated with *MCTC* cases are higher or lower than bureaucratic-based control cases. Having ordered categories (i.e., ordinal variables) enables us to test whether a negative association between the test variables exists (e.g., correlations and Jonckheere-Terpstra test). A negative association suggests that the ease of switching becomes more difficult when moving from market-based to trust-based controls. Although the results of the Chi-squared tests are significant, we recognize that (1) we lose some information when combining the high and moderate categories of ease of switching suppliers; (2) there are some empty cells; and (3) 70 (i.e., ≥ 20) percent of the cells have expected frequencies that are less than 5 (Siegel and Castellan 1988).

[11] The additional tests performed to determine if there is a negative association between the ease of switching suppliers and initial control choice are as follow. We first derive categorical variables from our qualitative data (e.g., for the ease of switching variable, low $= 1$, medium $= 2$, and high $= 3$; and for the initial control choice variable, market-based controls $= 1$, market/bureaucratic-based controls $= 2$, bureaucratic-based controls $= 3$, bureaucratic/trust-based controls $= 4$, and trust-based controls $= 5$) and examine correlations between the test variables. As expected, the Spearman's rho (-0.447; $p = 0.001$) and Pearson correlation (-0.531; $p < 0.001$) coefficients are negative and significant. We extend the JT test to all five groups of control choices and the standardized test statistic obtained is still significant (-3.242; $p = 0.001$). Finally, the results of the Mann-Whitney U-tests in Table 3, Panel B also show that (1) the ease of switching suppliers is significantly higher for market-based controls than other pure types of controls; and (2) switching suppliers is more difficult for firms adopting controls that required large investments in trust (i.e., *BCTC* and *TC*) than other types of controls (see Sensitivity Analysis I). These results are generally consistent with the ordinal logit regression results (see Model 1 in Table 4).

TABLE 3

The Association between Initial Control Choice and the Ease of Switching Suppliers

Panel A: The Ease of Switching Experienced by Firms in Our Sample with Different Initial Control Choices

		Ease of Switching Suppliers			
Coding Category	**Initial Control Choice**	**High**	**Moderate**	**Low**	**Total**
1	Market-based (*MC*)	4	1	0	5
2	Market/bureaucratic-based (*MCBC*)	2	0	1	3
3	Bureaucratic-based (*BC*)	1	2	4	7
4	Bureaucratic/trust-based (*BCTC*)	0	1	7	8
5	Trust-based (*TC*)	4	1	23	28
6	Market/trust-based (*MCTC*)	1	0	1	2
	Total	12	5	36	53

Panel B: Mann-Whitney U-Test (one-tailed for hypothesis: ease of switching associated with *MC* > ease of switching associated with *BC* > ease of switching associated with *TC*)

			p-value	
	n	**Test Statistic**	**Asymptotic**	**Exact**[a]
MC (28.50)[b] versus *TC* (14.85)	33	12.500***	0.000	0.001
MC (9.20) versus *BC* (4.57)	12	4.000**	0.010	0.020
BC (21.00) versus *TC* (17.25)	35	77.000	0.119	0.177
Sensitivity Analysis I—Including Hybrids[c]				
MC (36.40) versus [*BCTC* + *TC*] (18.86)	41	13.000***	0.000	0.000
MC (11.00) versus [*MCBC* + *BC*] (6.50)	15	10.000**	0.024	0.042
[*MCBC* + *BC*] (29.40) versus [*BCTC* + *TC*] (21.86)	46	121.000**	0.018	0.036
Sensitivity Analysis II—Excluding "Exceptions"[d]				
MC (28.10) versus *TC* (14.35)	32	9.500***	0.000	0.000
MC (8.20) versus *BC* (4.17)	11	4.000**	0.016	0.035
BC (21.33) versus *TC* (16.04)	33	55.000*	0.045	0.091

*, **, *** Indicate significance at the 10 percent (marginal), 5 percent, and 1 percent levels, respectively. Also, the probability of type II error is high due to the small sample sizes, limited variation, and large number of ties.

[a] When assumptions of asymptotic distributions may not hold due to small sample sizes, we follow Field (2009) and report on both asymptotic and exact p-values.

[b] The numbers in the parentheses refer to mean ranks.

[c] The hybrid controls have been added to the pure controls to form three new categories in order to increase the sample size. This classification is selected based on our expectation that *MC* cases are associated with the lowest investments in controls; *BCTC* and *TC* cases are associated with the highest investments, especially in relation to building trust; and *MCBC* and *BC* cases lie in between these extremes.

[d] The "exceptions" refer to the three cases identified as outliers in the qualitative analysis. Reasonable explanations were provided and documented for these cases. Sensitivity Analysis II also draws attention to the likelihood of type II errors given our small sample size by showing that the removal of one or two cases can significantly impact the results.

(see Table 3, Panel B) generally show, as expected, that switching suppliers becomes increasingly difficult when moving from firms that adopt market-based controls, to bureaucratic-based controls, and, finally, trust-based controls.

However, the challenge here is to isolate the impact of control choice on the ease of switching suppliers from the impact of other explanatory factors. We proceed to assess the relations between the other explanatory variables and the ease of switching suppliers. Our results are generally consistent with prior studies (see Appendix E for the measurement of the other explanatory variables). Similar to Young-Ybarra and Wiersema's (1999) study, the ease of switching suppliers decreases with *asset specificity* (Pearson correlation $= -0.638$; $p \leq 0.001$), and no conclusive evidence is obtained for the association between the ease of switching suppliers and (1) *power asymmetry*, (2) *the number of ties*, or (3) *prior partner experience* (i.e., there is no significant correlation coefficient). We also do not observe any significant association between *prior alliance experience* and the ease of switching suppliers. This indicates that, with the exception of asset specificity, other factors do not explain the ease of switching suppliers across cases.

For completeness, we undertake ordinal logit regressions of ease of switching suppliers (ES) on (1) two test indicator variables reflecting firms with different control choices, namely, market-based controls (*MC*) and trust-related controls[12] (*TR*); and (2) the same test indicator variables and the only other explanatory variable that is significantly correlated with ES—asset specificity (*AS*). We expect the coefficient on *MC* (*TR*) to be positive (negative), i.e., the ease of switching associated with *MC* (*TR*) is likely to be higher (lower) relative to other types of controls chosen. The results in Table 4 show that the coefficients of *MC* (parameter estimate $= 2.2789$; $p < 0.1$) and *TR* (parameter estimate $= -1.5334$; $p < 0.05$) in Model 1 have the predicted signs and are marginally significant and significant, respectively. However, both coefficients become insignificant when we control for *AS* (parameter estimate $= -1.5205$; $p < 0.05$) in Model 2. These findings seem to suggest that asset specificity, and not control choice, is the only significant predictor of the ease of switching suppliers. While we acknowledge that asset specificity determines both control choice (e.g., van der Meer-Kooistra and Vosselman 2000; Dekker 2004; Krishnan et al. 2010) and the ease of switching suppliers, we expect that control choice will have an incremental effect on the ease of switching suppliers. The lack of significance in the regression results is attributable at least in part to the following: (1) the high correlation between asset specificity and control choice, which increases the difficulty of capturing the incremental contribution of control choice over *AS* in explaining ES;[13] and (2) the low power arising from categorical variables with limited variation.[14]

Given the potential issues with our regression results, and to better inform the relation between control choice and ease of switching supplier, we identify interview narratives in which respondents provide a direct link between the two variables (e.g., unwillingness to re-incur time and resources to select another supplier). This evidence allows us to determine whether initial control choice has an incremental effect on ease of switching suppliers, over and above other correlated explanatory variables, such as asset specificity. We identify 25 cases, nearly 50 percent of our sample, where the

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[12] Trust-related controls encompass cases in which firms adopt trust-based controls and cases in which firms adopt bureaucratic/trust-based controls. We combine trust-based and bureaucratic/trust-based control cases to reduce any loss of power, as the reasons provided by respondents for the ease of switching suppliers are very similar in these cases.

[13] *MC* and *AS* are negatively and highly correlated (Pearson correlation coefficient $= -0.717$; $p < 0.001$); *TR* and *AS* are positively and highly correlated (Pearson correlation coefficient $= 0.628$; $p < 0.001$).

[14] Our test independent variable is a categorical variable with indicator variables representing the various categories, hence resulting in numerous data points being 0. By reducing our rich qualitative data into a few coarse "catch-all" categories for each variable (e.g., descriptions of actual control practices are replaced by two indicator variables representing the presence (1) or absence (0) of market-based controls and trust-related controls respectively), we throw away information. Not using this information is likely to reduce the power of the test.

TABLE 4

Ordinal Logit Regression Results
Ease of Switching Suppliers

Logit Regression:[a]

$$ES = b_0 + b_1MC + b_2TR + b_4AS$$

	Model 1		Model 2	
Independent Variables	**Parameter Estimate**	**Chi-square Statistic**	**Parameter Estimate**	**Chi-Square Statistic**
MC	2.2789	3.0097*	0.3411	0.0458
TR	−1.5334	4.1650**	−0.8054	0.8585
AS			−1.5205	4.8376**
Sample Size	n = 51		n = 51	
Likelihood Ratio		15.5973***		20.6819***

*, **, *** Indicate one-tailed significance at the 10 (marginal), 5 percent, and 1 percent levels, respectively.

[a] To run the ordinal logit regression, we combine the five types of controls into three main categories as follows: (1) *MC* (market-based controls); (2) *MCBC* (market/bureaucratic-based controls) + *BC* (bureaucratic-based controls); and (3) *TR* (trust-related controls) = *TC* (trust-based controls) + *BCTC* (bureaucratic/trust-based controls) (see Table 3, footnote c for the rationale underlying this classification). Therefore, we do not incorporate a third indicator variable to capture the presence or absence of *MCBC* + *BC* category because this will result in redundancy. In addition, we conduct two sensitivity analyses. First, we run the ordinal probit model. The results are similar, but we report the ordinal logit regression model as it does not assume that error terms are normally distributed. Second, we replace *TR* with *TC* and rerun the ordinal logit regression models using all five original types of controls. The results are similar, except that the coefficient of *MC* is now significant at the 0.05 level, while the coefficient of *TC* is no longer significant. This change in results is likely to be attributable to the increase in the number of data points that are coded as 0.

b_0 = intercept(s).

ES (ease of switching suppliers)
= ordinal variable coded 1 = low (i.e., difficult to switch); 2 = moderate (i.e., lies between easy and difficult to switch); and 3 = high (i.e., easy to switch).

MC; *TR*
= dichotomous variable coded 0 = cases where firms selected this type of control; and 1 = cases where firms did not select this type of control.

AS (Asset Specificity)
= ordinal variable coded 1 = low; 2 = moderate; and 3 = high.

reasons for the ease of switching suppliers explicitly relate to the switching costs directly attributable to initial control choice.[15] Some examples of quotes to support our interpretation of the direct link between control type and ease of switching suppliers follow (see Appendix D for more comprehensive narratives):

> Because of the heartache we have to go through to do a tender and because of the time it can take to implement someone new. I mean there is two years involved in that. A lot has got to go

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[15] In seven of the remaining cases, firms with trust-based control cases experienced greater difficulty in switching suppliers because of their good relationships with incumbent suppliers. However, none of the respondents discussed control-related switching costs, especially with regard to building relationships or trust with suppliers. We argue that switching costs can be inferred from evidence in other cases where firms: (1) invested in building trust, and (2) were less willing to re-build trust with a new supplier when they had a good relationship with the incumbent. Respondents in one bureaucratic-based control case and two market/bureaucratic-based control cases also indicated that a good relationship was absent or did not affect the ease of switching suppliers. However, we acknowledge that the results in these ten cases provide weaker support for our hypothesis and are conservative in excluding them.

> wrong for me to want to waste two years of my time going through a process like that. I17 (446)

> But it is difficult sometimes to find the appropriate supplier to readily take things over, particularly when we have a high regard or a high need for ensuring that they have a similar operating philosophy to what we have. I mean we hold that very highly and I think for that reason we take a lot of time to make sure we select the right one because we like a long-term relationship. I10A1, A2 (311)

> There's the cost involved in now going out and finding another service provider, there is the risk in the upheaval associated with moving such a big operation into a new environment . . . So there are obviously switching costs associated with moving something like this, so it is significant. Then you've got the cultural risks and the relationships have to be rebuilt . . . Well, it means that we have to make it work, really . . . It's difficult to switch. We've got a significant investment in the relationship, so there is a significant motivation to making it work. I27A1 (553)

> [W]e recognize there is a cost to us from breaking a relationship even though we're not the supplier. There's still a cost of integration, from setting it all up again, from going through the process again [referring to the process of evaluating samples produced by the short-listed candidate]. It's something that, where we can, we'd like to avoid it, and keep a successful relationship. I21 (727)

Table 5 summarizes our findings on the association between initial control choice and ease of switching suppliers for the 25 cases, and identifies the switching costs attributed to the type of control chosen. Similar to the patterns observed in Table 3, Panel A, the proportion of cases in the *Low* column of each control category increases as we move from market/bureaucratic-based controls (1 out of 2) down to trust-related controls (18 out of 19). The results of Chi-square tests that assess the significance of these differences are mixed (Pearson chi-square statistic $= 4.192$; $p = 0.123$ and MH Chi-square statistic $= 3.830$; $p = 0.050$).[16] However, the JT standardized test statistic (-1.904, $p = 0.029$) and the correlation coefficients (Spearman's rho $= -0.389$; $p = 0.028$; Pearson correlation $= -0.400$; $p = 0.024$) computed are significant, thus providing support that switching suppliers becomes increasingly difficult when moving across these groups of cases.[17] We also draw attention to the low power of these statistical tests that is attributable to the reduced sample size ($n = 25$).

We first look at trust-related control cases and observe that the ease of switching suppliers is low, with the exception of one case for which the ease of switching suppliers is high.[18] The reasons provided by these cases are very similar and are summarized as follows. First, managers in 14 cases

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[16] As a sensitivity analysis, we split the trust-related group into the original *BCTC* and *TC* groups, and the MH statistic becomes marginally significant. We argue that power is lower as the number of cells with expected frequencies less than 5 has now increased (88 percent). Indeed, the Chi-square statistics become significant ($p < 0.05$) once we duplicated each data point to double the sample size.

[17] When we perform the JT test using the four original categories of control choices, the test statistic becomes marginally significant (-1.345; $p = 0.090$). This is not surprising given the low power of the test. The test statistic becomes significant again upon duplicating the sample (-1.921; $p = 0.028$).

[18] Although the firm in this case adopted trust-based controls, case evidence suggests that the ease of exiting the relationship and switching suppliers is high due to (1) the termination clauses incorporated in the contract; and (2) less emphasis being placed on relationship building. While the firm exerted some effort in supplier selection and contracting and subsequently reduced the level of monitoring, the supplier was the party that exerted far more effort and was very keen to establish a relationship. Given these unique circumstances, the evidence provides general support for the theory underlying our hypothesis by showing that the ease of switching suppliers is higher when investments made by firms are lower.

TABLE 5

Evidence of the Relation between Initial Control Choice and the Ease of Switching Suppliers (i.e., where respondents indicate that control-related switching costs influence the ease of switching suppliers, n = 25)

	Ease of Switching Suppliers[a]		Reasons Provided for the Relation between Control Types and Ease of Switching Suppliers[b]		
Control Types	**High**	**Low**	**Search**	**Transition**	**Relationship Building**
Market/bureaucratic-based	1	1	1	—	1
Bureaucratic-based	1	3	—	3	(1)[c]
Trust-related	1	18	14	12	10

[a] The numbers refer to the number of cases with the respective ease of switching suppliers.

[b] The numbers refer to the number of cases where respondents either indicate that (1) the re-incurrence of respective transaction costs (e.g., search, transition, and relationship building) reduces the ease of switching suppliers, or (2) the costs incurred will reduce subsequent levels of monitoring and enforcement relative to a new supplier (i.e., show that transaction costs are investment in nature).

[c] Relationship building cost is mentioned to have no impact on the ease of switching suppliers here.

are unwilling to reincur high search costs to select the right suppliers. Second, firms in 12 cases previously incurred substantial transition costs to: (1) familiarize the supplier with the task; (2) ensure that suppliers' processes are meeting firms' requirements; and (3) build relationships. We observe in several cases that firms retain their incumbent suppliers to avoid re-incurring similar costs to establish controls with new suppliers. Some respondents are also reluctant to switch suppliers, as their incumbents are managing well and require less monitoring over time. As expected, these findings suggest that the ease of switching suppliers decreases with switching costs arising from initial control choice—both opportunity costs and reinvestment costs incurred to establish comparable controls with a new supplier.

Unlike other investment costs incurred to establish controls, high contracting costs do not necessarily translate to greater difficulty in switching suppliers. Although higher re-contracting costs suggest potentially greater difficulty in switching suppliers, this is offset to the extent that contracting costs are incurred to incorporate comprehensive termination clauses. We conclude that the ease of switching suppliers for trust-related control cases is reduced by opportunity costs and reinvestment costs, in particular, supplier search, transition, and relationship-building costs.

Respondents in ten additional cases express varying degrees of reluctance to switch suppliers after the contracts have ended. Eight respondents attribute at least part of their reluctance to the need to reinvest in controls to manage new suppliers. Since these firms no longer have a legal obligation to transact with their incumbent suppliers, their intentions provide further evidence that initial controls generate switching costs that reduce the ease of switching suppliers. In extreme cases, initial controls prevent firms from switching suppliers.

Next, we observe that the ease of switching suppliers is low in three of the bureaucratic-based control cases and high in the fourth case. The ease of switching suppliers is only affected by the re-incurrence of one type of cost in establishing controls—the transition costs incurred by firms in testing the supplier's products to ensure compliance with firm standards.

> Once that unique product [from the supplier] has been identified and, you know, tested and implemented, that becomes very valuable. You know the time spent on doing that is expensive. And you really need something reliable. So to sack one [supplier] and move to another is pretty traumatic and therefore it is always important to try and get it right at the front end. I7A1 (285)

This differs from trust-based control cases where supplier search and relationship-building costs are also re-incurred. The respondent in one case also explained that it was much easier to switch suppliers in the absence of a good relationship because no opportunity costs are incurred.[19] Hence, the control-related switching costs generated by existing bureaucratic-based controls are generally lower than trust-related controls. It is also notable that the managers in two cases expressed no qualms in switching suppliers once the contracts are concluded. These firms re-tender the contracts and select the supplier that puts forward the best deal.

> They were performing OK. It's just somebody was going into it better or for a better price or same quality, better price. Or had better ideas about how they're going to do it better. I16 (510)

Finally, the two market/bureaucratic-based control cases are associated with a high and low ease of switching suppliers, respectively. Further analysis shows that the firm with the low ease of switching suppliers was in the process of changing to trust-based controls. Since reinvestment costs incurred to establish new trust-based controls are higher than new market/bureaucratic-based controls, the expected ease of switching suppliers is lower than expected. These findings provide further support that firms that adopt trust-based controls incur high switching costs.

In summary, observed patterns in 53 cases reveal that the relation between initial control choice and ease of switching suppliers is consistent with expectations—the difficulty of switching suppliers increases when moving from firms that adopt market-based controls, to bureaucratic-based controls, and, finally, trust-based controls. Simple inferential statistics support this conclusion. We further draw on the interview narratives to isolate the specific impact of control choice from other explanatory variables, and identify the effect of control choice in 25 cases. Based on our analysis of this subset of our database, it would appear that the switching costs arising from investments made in establishing initial controls is the mechanism that influences ease of switching suppliers. Furthermore, the evidence indicates that these control-related switching costs vary with control choice.

Specifically, we recognize that opportunity costs are a function of investments made to establish controls. We observe that investments in controls (and, hence, opportunity costs) are highest when firms adopt trust-related controls, followed by bureaucratic-based controls, and then market/bureaucratic-based controls. We also observe that the need to reincur high supplier search, transition, and relationship-building costs to establish trust-based controls is higher than the need to reincur transition costs to adopt bureaucratic-based controls. Since transition costs are lower in bureaucratic-based control cases, and supplier search and relationship-building costs are only mentioned in trust-based controls cases, this finding indicates that firms invest more heavily in re-establishing trust-based controls than bureaucratic-based controls. In addition, the observed patterns show that the magnitude and type of transaction costs incurred by firms varies with control choice.

The respondents in the remaining 35 cases either (1) discuss other factors unrelated to extant controls (including ten cases that mention good relationships without discussing costs), or (2) indicate that the ease of switching suppliers is high, with no impediments faced by firms that switch suppliers. To enhance the validity of our results, we allow respondents to provide reasons for the ease experienced in switching suppliers instead of asking leading questions. The unprompted identification in interview narratives of the role of control-related switching costs provides strong evidence of a previously undocumented form of switching costs. The credibility of our results is also enhanced by the fact that we affirm the existence of other well-known sources of switching costs.

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[19] There are unusual circumstances surrounding this case. The difficulty of switching suppliers was high because the firm was in the middle of legal proceedings to terminate their incumbent supplier at the time of the interview.

Additional Analysis

We conduct one additional analysis to increase the robustness of the results. Given the potential for some firms to discuss hypothetical supplier-switching situations, we compare the results of cases in which firms did not switch suppliers with cases in which firms did switch suppliers. The result of the Pearson Chi-square test ($\chi^2 = 0.465$; $p = 0.793$) suggests that the proportion of cases for each category of ease of switching suppliers does not differ between the two groups. We also find that the relation between initial control choice and the ease of switching suppliers, and the reasons underlying the relation, are generally consistent across both groups.

VI. CONCLUSIONS

We examine how initial control choice influences the ease of switching suppliers in subsequent time periods. This is one of the first empirical studies to show that initial investments in controls, like other types of investments, give rise to switching costs and reduce the ease of switching suppliers (and impede such changes in extreme situations). We also provide some evidence that it is the level of investment associated with the control choice that explains the mechanism underlying the relation of interest. In doing so, this study contributes both to the strategic alliance and management accounting literature investigating dynamic issues associated with interfirm relationships; and to the branch of interfirm literature investigating determinants of exit barriers (e.g., Young-Ybarra and Wiersema 1999; Reuer and Arino 2002).

By showing that firms incur switching costs when discarding existing controls and adopting controls to manage new suppliers, we also provide some support for Williamson's (1996, 1998) argument that switching costs are generated by extant governance structures. While Williamson (1996, 1998) discusses the switch to alternative governance structures in situations when existing governance structures are suboptimal, his focus is still on the switching costs incurred when firms discard and adopt governance structures. The change will similarly be impeded if switching costs are sufficiently high. Williamson (1996, 1998) also does not make any predictions about whether, and how, switching costs will vary with initial governance structure choice. Our findings thus extend his work by shedding light on switching costs generated by existing controls, and showing how these switching costs vary with control choices.

Our results further extend prior management studies that examine barriers to exiting strategic alliances by suggesting that the influence of irreversible investments increase firms' propensity to retain the incumbent supplier beyond the contractual period. Evidence from another ten cases provides additional, but weaker, support for the hypothesis by showing that a negative relation exists between trust and the ease of switching suppliers. The good relationships present in trust-related control cases contribute to the creation of exit barriers, whereas such barriers do not appear to exist in bureaucratic-based and market-based control cases. These findings provide some evidence of the costly nature of trust, which is ignored by prior interfirm control studies in the management accounting literature (van der Meer-Kooistra and Vosselman 2000; Dekker 2004; Donada and Nogatchewsky 2006).

While the patterns across 53 cases show that the relation between variables of interest are in line with expectations, direct evidence supporting the hypothesis is only observed in slightly less than 50 percent of our sample (25 cases). We do not claim that initial control choice is the sole factor that reduces the ease of switching suppliers. The responses of more than half the participants in this study suggest that asset specificity also influences the ease of switching suppliers. We acknowledge that the time and effort invested to establish controls may be overlooked, especially in cases where they are much smaller than other investment costs. Despite this possibility, we identify control choices as a previously undocumented factor that affects the ease of switching suppliers by generating switching costs in slightly less than 50 percent of our sample.

Another potential concern arises from the fact that none of the respondents in firms that adopt market-based controls mention investment in controls, or the lack thereof, as a reason why these firms generally find it easy to switch suppliers. We argue that this is not surprising, as respondents are unlikely to discuss what they have not done. Respondents might also lack the knowledge or experience to know how their firms differ from firms that invest heavily in controls.

The method adopted in this study gives rise to certain limitations. First, as with most other non-experimental research, we cannot draw conclusions about the direction of causality—that control choice pre-empts the decision to switch suppliers.[20] We recognize that the adoption of controls before switching suppliers does not preclude the possibility that managers have anticipated this change, and selected controls with sufficient flexibility to facilitate the change. Nonetheless, our aim is to show that existing controls give rise to switching costs that reduce the ease of switching suppliers, regardless of whether the decision to switch suppliers is anticipated or otherwise. Second, we emphasize that the statistical findings in this study need to be interpreted with care. The probability of type II error is reasonably high. We expect power to be low given the small absolute size of our sample, the limited variation in most of the categorical variables that are either nominal or ordinal, and the large number of ties (Siegel and Castellan 1988). Also, given the purposeful sampling process, these statistical results are only generalizable to the subset of the population that resembles our sample. We emphasize that theoretical and not statistical generalizability is the goal of qualitative methods. Third, recall and hindsight biases are inherent problems of the retrospective approaches to data collection (Golden 1992). These limitations are mitigated to a certain extent by the more objective nature of the data (Anderson and Dekker 2005; Dekker 2008), and by encouraging respondents to refer to relevant documents. Finally, we are only able to obtain mainly qualitative information about transaction costs incurred by each firm. There is much work to be done to develop an objective and quantitative measure of transaction costs.

The findings of this study can be extended in several ways. We observe that trust-based controls are not perceived to influence the ease of switching suppliers in some cases. Future research could explore other factors that moderate the relation of interest (e.g., size of investments in specialized operating assets). In addition, most of the activities outsourced in this study do not require a high level of collaboration. Future studies could focus on the most innovative R&D industries (e.g., biotechnology), where extensive cooperation between transacting parties is required. While exit barriers are likely to be high in these arrangements, an unsolved question is the extent to which they are caused by investments in transaction-specific assets or controls. We also find evidence that the bonds of trust are forged and maintained in various business-related ways, which endorses the concept of rational trust (e.g., Dekker 2004; Anderson and Sedatole 2003; Adler 2001). This raises questions about the different types of trust that exist between transacting parties, and the role(s) played by each. Finally, while we refer to Williamson's (1996, 1998) discussion on suboptimal governance structures, we do not investigate this issue. Future studies could explore the switching of controls in misalignment situations.

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[20] We believe that this issue is mitigated to some extent by the structure of our interviews. We ask the respondents a sequence of questions, and make it very clear that our questions relate to two distinct time periods. We start by asking them to discuss initial control choice and other variables at the outset of outsourcing arrangements, and later in the interview ask them to discuss supplier switching that takes place in subsequent time periods. Our line of questioning also encourages respondents to think about reasons why they find it easy or difficult to switch suppliers. Hence, their focus tends to be on how and why controls affect the ease of switching suppliers rather than in the opposite direction.

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APPENDIX A

Information on Firms in the Sample

Panel A: Standard Industry Classification (SIC) Information on Firms in Sampling Frame

Two-Digit SIC Code[a] Major Groups	Description	No. of Firms that Participated
17[b]	Construction—Special Trade Contractors	1
20	Food and Kindred Products	4
21	Tobacco Products	1
22	Textile Mill Products	1
23	Apparel and Other Finished Products Made from Fabrics and Similar Materials	1
24	Lumber and Wood Products, except Furniture	1
26	Paper and Allied Products	5
28	Chemicals and Allied Products	2
29	Petroleum Refining and Related Industries	2
30	Rubber and Miscellaneous Plastics Products	1
32	Stone, Clay, Glass, and Concrete Products	1
34	Fabricated Metal Products, except Machinery and Transportation	1
35	Industrial and Commercial Machinery and Computer Equipment	2
36	Electronic and Other Electrical Equipment and Components, except Computer Equipment	2
37	Transportation Equipment	2
38	Measuring, Analyzing, Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks	1
50[c]	Wholesale Trade—Durable Goods	1
		29

Panel B: Reconciliation between Number of Firms, Number of Interviews, and Information on Interviewees

No. of Firms	No. of Interviews Per Firm	Total No. of Interviews[d]	Title	No. of Respondents	No of. Informants[d]
23	1	23	CXO[e]	6	
5	2	10	Director[e]	2	
1	3	3	Manager	29	2
			Staff	1	
29		36		38	2

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APPENDIX A (continued)

Panel C: Summary Statistics

Based on Firms[f]

Type of Statistics	Length of Interview (mins.)	No. of Staff	Annual Revenue($)[g]	Total Assets($)	No. of Activities[h]	No. of Phases[i]
Mean	100.42	1,798	1,212,795,070	691,363,773	1.85	2.00
Minimum	58.10	31	104,195	1,000,000	1.00	2.00
Maximum	324.55	6,500	5,895,800,000	7,000,000,000	7.00	2.00
Sample Size	29	25	17	22	27	4

Panel D: Further Information on Sizes (breakdown of proxies into ranges)

No. of Employees	No. of Firms	Total Assets ($mil.)	No. of Firms
< 1,000	6	< 100	5
1,000 to < 2,000	10	100 to < 500	9
2,000 to < 3,000	5	500 to < 1,000	5
3,000 +	4	1,000 +	3
	25		22
No information provided	4	No information provided	7

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[a] Many of the firms belong to other industry groups that are not listed in Panel A, and some have multiple two-digit SIC codes within the Manufacturing Industry Group. However, to allow a more comprehensive display of data, the first SIC code for each firm is selected.

[b] The respondents in this company were referred to the interviewer by another company in the same group with SIC code 36.

[c] This company is classified as a manufacturer under the "Industry Classification" in *The Business Who's Who of Australia*, although the SIC code states otherwise.

[d] The interviewer spoke to the informant who subsequently referred the interviewer to the respondent. These informant interviews are not included in the 36 interviews.

[e] CXO stands for CEO, CIO, and CFO; "Director" refers to a manager holding that title (e.g., Director of Distribution), and not to a board member.

[f] If respondents from the same firm discussed activities outsourced at different levels, we selected the highest level of analysis with the largest value.

[g] Sources of annual revenue include the two directories of companies, 2004 annual reports for listed companies, information from the firms' websites, and estimates provided by respondents. The information was extracted from the level closest to the level of the outsourced activity.

[h] The number of activities refers to the outsourced activities discussed by each respondent.

[i] The number of phases refers to number of contractual periods discussed by each respondent when the same activity was outsourced to different suppliers in different contractual periods.

APPENDIX B

Definition of the Codes

Tree Address	Title of Node	Definition of Node
(1)	Initial Control Choice	The three controls in the typology and their respective control mechanisms across all the phases.
(1 1)	• Contact Phase	Control mechanisms and procedures in place when searching for and selecting the supplier.
(1 1 1)	o Selection Criteria	Criteria that the supplier is evaluated against during the selection process.
(1 2)	• Contract Phase	Control mechanisms and procedures in the contracting and negotiating process.
(1 2 1)	o Terms of Contract	Details of the contract.
(1 2 1 1)	• Standard Terms	Terms and conditions in the contract that apply under usual conditions.
(1 2 1 2)	• Flexibility of Arrangement Clauses	Contractual clauses that specifically allow contracts to be modified or terminated, and/or procedures to be followed in order to vary or terminate the contracts.
(1 2 2)	o Process of Contracting	Any action (e.g., negotiations and hiring legal advisors) that is associated with contracting, and has taken place for the purpose of arriving at an agreement between both parties.
(1 3)	• Execution Phase	Control mechanisms and procedures adopted after an agreement has been reached (and formalized) to manage the contract and monitor performance when transactions commence.
(1 3 1)	o Transition/Implementation Process	Control mechanisms or procedures adopted during the transitional process (i.e., moving from one supplier to another) or implementation of the new processes. Generally relates to the period where the firm assists the supplier in starting up and getting the processes up and running.
(1 3 2)	o Outcome and Behavioral Controls	Control mechanisms or procedures that allow the evaluation of (1) outcomes, (2) supplier behavior, or (3) supplier processes against expectations (i.e., checkpoints).
(1 3 3)	o Trust Controls (Execution Phase)	Behavior that demonstrates trust in the supplier and reliance on trust in terms of managing the transactions. Includes: (1) level, type, frequency, and aim of monitoring; and (2) confidence expressed in the supplier even with the lack of monitoring.
(1 4)	• Training	Training provided by the firm to the supplier that relates to controls.
(1 5)	• Communication	The nature, including structure, and degree of the communication in place.
(1 6)	• Relationship	Information on the relationship between transacting parties. This will also capture trust.

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APPENDIX B (continued)

Tree Address	Title of Node	Definition of Node
(1 6 1)	o Intended Relationship	Description of the type (or nature) and length of relationship that the firm intends to form with their supplier. Also, the level of intended commitment to the relationship.
(1 6 2)	o Building and Maintaining the Relationship	Steps taken to actively build or maintain the relationship or trust between the transacting parties.
(1 6 3)	o Description/Evidence of Extant Relationship	Description/evidence of the relationship that exists between the transacting parties.
(1 7)	• Self-Classification	Information relating to the scenario-type measure.
(1 8)	• Corporate Culture	Norms and values of the organization in general, and especially in relation to controls.
(1 8 1)	o Alignment of Firm and Supplier Culture	Steps or procedures adopted to align the culture of the supplier with that of the firm.
(2)	Transaction Costs	Costs incurred in establishing and implementing controls to manage suppliers (e.g., time, effort, and expenditure).
(2 1)	• Costs Incurred in Contract and Contract Phases	Costs incurred in supplier search and selection, and in contracting.
(2 2)	• Costs Incurred in Execution Phase	Costs incurred in the monitoring of contract execution (and also transition costs).
(3)	Asset Specificity	Investments made or costs incurred that are capital in nature and incurred for the purpose of producing the specific outsourced product or service. Also, additional investments made for the same purpose with new suppliers when the firm switches suppliers, and additional investments made to produce the product or service in-house if the activity is brought back in-house.
(4)	Power/Dependence	The dependence of one party on the other.
(4 1)	• Outsourcing Firm's Dependence	Perception of dependence on supplier. Includes number of alternative suppliers, and percentage of sales attributable to the goods or services provided by supplier.
(4 2)	• Perception of Supplying Firm's Dependence	Perception of supplier's dependence on the firm. Includes percentage of supplier's sales that relates to the firm's purchases, and investments made by the supplier that is specific to the firm.
(5)	Outsourcing Environment in Relation to Supplier	Information about suppliers of the outsourced activity in the current period.
(5 1)	• Current Outsourcing Environment	Information about suppliers of the outsourced activity or similar activities.
(5 1 1)	o Number of Ties	Information about other contracts that is ongoing with the incumbent supplier.
(5 2)	• Past Outsourcing Environment	Information about suppliers of the outsourced activity in the previous periods.
(5 2 1)	o Prior Relationship	Length of the relationship that the firm has with the incumbent supplier prior to this contract.

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APPENDIX B (continued)

Tree Address	Title of Node	Definition of Node
(5 2 2)	○ Prior Experience	Information about the outsourcing of the same activity or similar activities with different suppliers.
(6)	Ease of Switching Suppliers	Information relating to the ease of exiting the outsourcing arrangement and switching suppliers.
(6 1)	• Actual Switching	Supplier switching has taken place. Perception of the ease of exiting the outsourcing arrangement and switching suppliers and related information.
(6 2)	• No Switching	No supplier switching. Perception of the ease of exiting the outsourcing arrangement and switching suppliers and related information.

APPENDIX C

Measurement of the Initial Control Choice Variable

Panel A: Contact Phase

MCTC (I9A3)	*MC* (I2A1)	*MCBC* (I26A2)	*BC* (I30A1)	*BCTC* (I29P2)	*TC* (I27A2)
1. Selection Method and Criteria					
The selection process is largely based on past experience with the supplier. The main criterion is the supplier's ability.	The selection process is limited to obtaining information in the market about suppliers (e.g., via trade fairs), and selecting one that meets the employees' training needs. There is no formal checklist of criteria, and the most important criterion is price.	A small tender is conducted where specific suppliers are invited based on reputation or related companies' experience. The selection process takes three months and is conducted by a team of purchasing staff (and others if needed). Price is the main criteria.	A tender is conducted in line with firm policy and procedures. Suppliers are selected based on their reputation, capability, quality, control systems, and price. Successful contenders participate in an e-auction. The process takes more than two months (intensive).	A tender is conducted and a detailed specification document provided. Formal procedures are followed and potential suppliers' responses are checked and evaluated. Most important criteria are quality, capacity, control, and price. This two-to-three-months process involves two managers.	First, a team of senior regional and global management identifies potential suppliers (> 3 months) based on cultural, strategic, and operational fit. Then the firm selects the supplier based on regional recommendation, knowledge of supplier, and price.
2. Understanding the Supplier					
No investigation is required. The firm is able to rely on past experience with the supplier.	The identity of the supplier is not important.	Site visits are usually conducted to inspect the supplier's processes, but the investigation is rather superficial.	The supplier's processes and products are audited to verify their capabilities and control systems, etc. They are given a report, and their responses and proposed corrective actions are then assessed.	Each supplier's background and references are checked. Further checks on the individual supplier's personnel who will be potentially providing the services to their firm.	Regional level does a lot of work to verify those suppliers' reputation and the value they can add. This includes background checks, presentations, meetings, and evaluation of suppliers' processes.

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APPENDIX C (continued)

Panel B: Contract Phase

MCTC (I9A3)	*MC* (I2A1)	*MCBC* (I26A2)	*BC* (I30A1)	*BCTC* (I29P2)	*TC* (I27A2)
1. Details of Contract or Equivalent					
No contract is entered into per project. Some of the terms incorporated in the overarching contract that was entered into at the outset have become obsolete.	No contract is entered into. Instead, the order number provided by the manager confirms acceptance of the quote and enrollment.	The contract follows relatively standard firm guidelines in line with global best practices. The contract is tailored to incorporate intellectual property rights, Key Performance Indicators (KPIs), and clauses that allow termination upon nonperformance.	The contract incorporates information on price, volumes, quality requirements, and KPIs. They also set up a quality agreement focusing on process issues, which is incorporated as part of the annexure or in the contract.	The contract is very detailed and incorporates reporting requirements, processes, future action plans, or intended changes. Also, flexibility has been incorporated through termination and variation of contract procedures, and the right to reduce services.	The group has contracts at three levels—global, regional, and firm level. At firm level, a letter of intent is initially signed to indicate the parties' commitment in good faith to proceed as agreed. The very detailed firm-level contract is entered into only one year later.
2. Contracting Process					
The process is very short and ranges from one phone call to one meeting for determining the time scale and budget of the project.	The negotiation process is very short and generally takes only a couple of hours. The supplier provides a quote that is relatively standard for the type of course.	Contracting takes two to three months with the negotiation process being the quickest, and more time is spent to ensure that specifications are right.	The negotiation process takes around two months because of the "to-ing" and "fro-ing" involved.	The contract is based on prior contracts and the process takes a month. Open communication is strongly encouraged to promote understanding and clarity. The legal team is involved.	The letter is drafted within days and the contract within weeks. However, contracting is delayed to allow both parties to understand the risks and costs involved to ensure a robust and fair contract.

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APPENDIX C (continued)

Panel C: Transition Phase

MCTC (I9A3)	*MC* (I2A1)	*MCBC* (I26A2)	*BC* (I30A1)	*BCTC* (I29P2)	*TC* (I27A2)
NA	NA	NA	The effort exerted mainly relates to the transfer of files and the monitoring of the set up. In addition, they conduct audits to validate their supplier's system and processes.	A lot of effort is spent especially in the first six months with firm personnel helping the supplier to get up to speed and helping to resolve issues.	The transition process takes about four to eight weeks and is monitored relatively intensively. The main purpose is to help the supplier improve and get up to speed.

Panel D: Execution Phase

MCTC (I9A3)	*MC* (I2A1)	*MCBC* (I26A2)	*BC* (I30A1)	*BCTC* (I29P2)	*TC* (I27A2)
The controls in place are largely informal and include the voluntary exchange of information and updates. Reliance is placed on the supplier's good reputation (which is crucial in this industry), and they are expected to self-manage. A formal report that incorporates the final results is provided at the end of the project.	The manager mainly relies on informal feedback provided by course participants. Only about 15-20 minutes is spent with each employee.	Systems and procedures are in place to ensure that the supplier meets production and pre-set KPIs. The actual time and effort spent on monitoring this supplier, however, is much less than for other suppliers. Some effort is made to help the supplier improve. However, if nothing changes, they will switch to another supplier.	Once the supplier's system and processes are validated, audits are conducted yearly or once in two to three years to monitor the supplier's systems. In addition, random samples from each delivery are tested. Confidence in suppliers mainly arises from thorough checks of their supplier's systems, and the supplier's willingness to implement recommendations.	Once the processes and systems are in place, management reports are provided to the firm's manager who spends a couple of hours per week reviewing the KPIs. He is unwilling to spend too much time in monitoring. Confidence is expressed in supplier's performance, and understanding and tolerance is displayed toward mistakes.	Procedures and systems are in place, with KPIs that capture outcomes and specific points of failures and dependencies. The level of monitoring is reduced once confidence in supplier's performance is built. The firm is patient with the supplier's mistakes, and a great deal of effort is spent to help them improve.

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APPENDIX C (continued)

Panel E: Contextual Factors

MCTC (I9A3)	*MC* (I2A1)	*MCBC* (I26A2)	*BC* (I30A1)	*BCTC* (I29P2)	*TC* (I27A2)
1. Communication There is relatively limited informal communication at the operational level. Also, there are no monthly performance review meetings.	There is little (if any) interaction between the manager and the supplier after the initial meeting. When designing a new course, there will be a couple of informal follow-up calls.	Formal monthly performance reviews meetings are conducted. There is otherwise relatively limited interaction with the supplier, which usually relates to informal communication of operational issues.	Formal monthly performance reviews meetings are held. In addition, the focus of formal and informal interactions is largely on operational and business issues.	There is very regular formal interaction and some informal interaction that relates mainly to operational issues. Senior managers attend monthly performance meetings where important matters are also discussed; the manager attends weekly operational meetings. Furthermore, the firm ensures that they are in frequent contact with the supplier, even when there are few issues to be resolved or discussed.	There is constant formal and informal interaction for various purposes at different levels. Formal meetings are held (from senior management to operations-level staff) to formulate plans, discuss strategies, and review performance and other operational issues. The level of interaction remains constant over time. However, the focus is moving toward improvement.

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APPENDIX C (continued)

MCTC (I9A3)	*MC* (I2A1)	*MCBC* (I26A2)	*BC* (I30A1)	*BCTC* (I29P2)	*TC* (I27A2)
2. Relationship					
The relationship with this supplier has long been established both at the managerial and company level. The relationship continues to be maintained through some socialization, and the supplier also attends the firm's strategic meetings in order to be updated about the firm's strategic direction.	There is no intention to continue with any one supplier for the long-term. No time is wasted on actions to build trust and the manager does not think that the firm's relationship with the supplier is critical.	The actions taken to build relationships appear to be heavily focused on increasing the supplier's capabilities (e.g., providing training and development for them, and promoting supplier awareness of firm processes and *vice versa*). Also, certain suppliers are cooperative because of their corporate culture. Length of relationship will be conditional on performance.	There is a general awareness that all transactions are on a contractual basis. Hence, suppliers are competing against other suppliers in the market, and the better supplier will win. They appear to have a good business relationship, and have constant exchanges about the business. In addition, the supplier is viewed as being quick to respond.	The firm intends to continue to work with this supplier even with plans to change the system, which will have an effect on the outsourced activity. The relationship is built and maintained by regular and frequent contact right from the contracting process. The relationship appears to be very good. However, the supplier seems to be the more active party in building the relationship and demonstrating goodwill.	The firm is committed to forming a long-term strategic partnership and making the partnership work. The building and maintaining of a good relationship (i.e., trust) has been emphasized from the selection process. The firm believes in the integrity of the supplier and in treating them fairly. Also, relationships exist within hierarchical levels—from top management level to operational level.

APPENDIX D

Examples of Illustrative Quotes

Control Type[a]	Quote	Phase (Mainly relates to)	Building Trust	Switching Ease	Beyond Contract
TC	"Because of the heartache we have to go through to do a tender and because of the time it can take to implement someone new. I mean there is two years involved in that. A lot has got to go wrong for me to want to waste two years of my time going through a process like that." I17 (446)	Search		Low	+
TC	"But it is difficult sometimes to find the appropriate supplier to readily take things over, particularly when we have a high regard or a high need for ensuring that they have a similar operating philosophy to what we have. I mean we hold that very highly and I think for that reason we take a lot of time to make sure we select the right one because we like a long-term relationship." I10A1, A2 (311)	Search	+	Low	+
	The respondent further supports his point by providing an example where another supplier that was not coping well was allowed 12 months to change, although there were other suppliers in the market. I10A1, A2 (479:485)				
BCTC	"If we had to go and do something else, terminate and get someone else, I'd have to go and get someone to manage that thing for me . . . if we need to change I need someone to manage the whole change process. So I'd have to get someone else to say, as you said, maybe a consultant to help me go and pick a new tenderer . . . Yes, that from scratch again. It would be difficult purely because of the time and effort involved. Initially, there's a lot of work involved." I29P2 (676:682)	Search		Low	
	"[I]t would still depend on the tender process, but obviously they have a big foot in the door because they've had a good track record with us . . . because price is important, but the services side is very important to us . . . You always have a problem or an issue, we want to know what processes you've got in place to deal with that and we've had a lot of exposure to Supplier X so we know their service side has been very good." I29P2 (658)				+
TC	"There's the cost involved in now going out and finding another service provider, there is the risk in the upheaval associated with moving such a big operation into a new environment. . . So there are obviously switching costs associated with moving something like this, so it is significant. Then you've got the cultural risks and the relationships have to be rebuilt . . . Well, it means that we have to make it work, really . . . It's difficult to switch. We've got a significant investment in the relationship, so there is a significant motivation to making it work." I27A1 (553)	Search/ Transition	+	Low	

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APPENDIX D (continued)

Control Type[a]	Quote	Phase (Mainly relates to)	Building Trust	Switching Ease	Beyond Contract
TC	"Of course it is [difficult to terminate the relationship] . . . Because again, all you need to do is to actually find a new supplier, and go through the process again. . . A lot of time wastage [sic] for us and we need to make sure we choose the right supplier this time and get rid of these guys, transition them out of the business and transition the new incumbents in." I18	Search/ Transition		Low	
TC	"It took us about 18 months to implement Supplier X into the task properly. You know for 18 months I had to do a lot of work just to make sure that everything was happening the way it should be. And then the last 18 months have been quite a lot easier because Supplier X has been managing it themselves. So that is why I am not keen to sort of immediately switch to someone else." I17 (83)	Transition		Low	
TC	"[W]e would not just up and discontinue supply based on price alone for this sort of stuff. It's too much effort bringing a supplier in line. There's too much effort bringing a relationship up to an ongoing level to just walk away for a price." I28 (446)	Transition	+	Low	
BCTC	"[W]e recognize there is a cost to us from breaking a relationship even though we're not the supplier. There's still a cost of integration, from setting it all up again, from going through the process again [referring to the process of evaluating samples produced by the short-listed candidate]. It's something that where we can we'd like to avoid it, and keep a successful relationship." I21 (727)	Transition		Low	
BCTC	"Have to re-validate [referring to supplier's systems], yup. Have to re-validate it, you know, so there's a barrier to change unless there is some compelling reason to change. You'd probably be looking at several hundred thousand dollars to move a product." I13A2 (441)	Transition		Low	
	"Yeah, well we wouldn't want to go through the whole process again [referring to due diligence of supplier]" I13A2 (621)				+
BC	"[T]he cost in changing from that supplier to another supplier is enormous because they've got to go through all the same learning curve that the previous company went through, and all the mistakes that they went through. So for the first six or eight months or maybe even 12 months of the new contractor operation, you might find you've got ten times as many problems as you had before." I16 (486)	Transition		Low	

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APPENDIX D (continued)

Control Type[a]	Quote	Phase (Mainly relates to)	Building Trust	Switching Ease	Beyond Contract
TC	"[W]e say 'It's all up for grabs' [referring to re-tendering], but it's the devil you know and the devil you don't. And in this industry the devil you know, as long as they are doing the right thing, has a huge advantage ... Why is that so? Because we know how they operate. For example, if we are in Melbourne at the present time with Supplier X, then we know they do a great job. So you come along and you offer to do just as good a job as Supplier X, we sort of say 'Well, that's great, tell me what else you are going to offer me'... So if you are the incumbent and you are doing it for effectively what we think you should do it for, plus a profit. We allow a profit. Then for someone else to come in, either the incumbent has to not be doing the right thing or you, as someone coming in, has to offer something which is incredibly different." I34 (270:276)		+	Low	
BCTC	"Where we can, we tend to build the relationship and work with them to deliver what we need. So for instance with the new model that we're building in 200X, we've been talking to these people now for a long time, so they know it's coming up. And they know that it's harder for us to change than to stick with the same people. So we try and build that relationship and keep it." I26A1 (892)		+	Low	+
BCTC	"It would tempt me to [referring to changing to a potential supplier who offered a much lower price], but I think the first steps that we would go down would be to actually talk to our current supplier about it, say 'Look this person's at the market place, he's offering this. He's offering the same service blah blah blah as you.' Initially make them aware of it from their own point of view that, 'You know, this is something that is competition to you. And should this continue when the next review comes up, we'd consider them as an option.' So it's something that you talk to them about, give them the opportunity to fix it, I guess." I21 (733)			Low	+
TC	"Look, usually legally there's a legal notice required, six months, whatever it might be. And that's what you have to meet, so there's usually a legal requirement which we would meet." I28 (446)	Contracting		Low	
TC	"You're right, your upfront costs associated with going to the outsourcer and preparing it all. And if it's a failure in the first year, then your ability to recover that cost has gone and you tend to work that back into the penalties. If you give yourself the right to terminate through breach, well, you have it anyway through breach. But depending what the penalties are, you can pre-agree what those penalties will be if you were terminating ... And what you try to include in that contractual condition is the costs that you haven't defrayed by having the benefits of this outsourcing." I15 (262)	Contracting		High	

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APPENDIX D (continued)

Control Type[a]	Quote	Phase (Mainly relates to)	Building Trust	Switching Ease	Beyond Contract
TC	"But if you've got a contractual situation where it's just not worked the way they promised, then you've got the upper hand anyway. You would say to them, 'I want those people. I'm going to exit this contract and in order to not sue you for all your misrepresentation, I want the key people that I gave you back. And I want them back now or I want you to hand them over to somebody else that I decide.'" I15 (280) "You do incur costs when you enter an outsourcing relationship because you transfer people. You have a lot of contractual set up costs. You have a lot of costs to come back out of it again." I15 (529)	Contracting		High	
TC	"Sometimes any agreement is difficult to terminate before the life of the agreement. So, you do need to be careful the longer the agreement is, on making sure that the terms and conditions about termination are very clear and that for agreed situations, you should be able to walk away from the agreement. That's probably where most of the focus is. There're really two focuses. One is to meet the market commercially, which I talked about. The second is to make sure that any foreseeable grounds that you want to terminate is actually covered in the agreement that you can terminate without financial penalties." I22P2 (786)	Contracting		Low	
BCTC	"We, as a company, don't want to go out every three years and re-negotiate a contract like this because of all the infrastructure that's built in, and the relationship that we've got. And a lot of companies don't want to have to renew a contract all the time because they're large contracts, and it takes a lot of time and effort to sit down and negotiate a new contract." I11 (135)	Contracting		Low	+
TC	"It's pretty hard to terminate an alliance partner, especially a longstanding one . . . The strength of your relationship defines the level of tolerance that you're willing to put up with in terms of what might be substandard performance." I35A1, A2 (144) "No. If we had the same situation [where the decision was made to terminate the supplier] in Supplier X or Supplier Y, we would probably, as I said, be more tolerant and work a lot harder with them. We have a lot more faith that they've got our interests at heart and their willingness to work with us." I35A1, A2 (779)		+ (No mention of costs)	Low	
MC	"And in this instance here . . .There's poor performance but there's no really strong relationship, so the level of tolerance is fairly low." I35A3 (144)		+ (No mention of costs)	High	

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APPENDIX D (continued)

Control Type[a]	Quote	Phase (Mainly relates to)	Building Trust	Switching Ease	Beyond Contract
TC	"You know we wouldn't want to change it. I mean … not within ten years because we've been really happy with it … they've done a whole lot of things for themselves which we thought that's pretty neat. They've been pretty proactive, and there's a good relationship." I33A2 (1530:1542)		+ (No mention of costs)	Low	+
TC	"Secondly, as part of our agreement, we actually have the exit process fully documented in here as to what Supplier X had to do to help us move to someone else if we choose to do so. So we've actually built into the contract not just the start of the marriage but the dissolution of the marriage as well so that if we actually move away from Supplier X, and we're entitled to move away from them either partially or totally after three years… My belief is that we won't change. We've got a good relationship with Supplier X." I20 (139) "There will be Supplier Y and then the new Supplier Z and maybe someone else. Maybe by that time company ABC will have overcome their problems and they will be someone we might consider at that time. But I've got to say that the way it's going with Supplier X, formidably we wouldn't be too fussed about going somewhere else." I20 (153)		+ (No mention of costs)	Low	+
TC	"I characterize our relationship with that company as quite good. And if it wasn't like that, I probably wouldn't even contemplate … You know on the basis, where it might continue on, we might just, you know, we really might just say, 'Look it's not working.' Full stop. Forget it. But in my position, it'd probably be to try and find a way to continue to move forward because our relationship is sound and it warrants that sort of thing." I5A1 (208)		+ (No mention of costs)	Low	
MC	"The relationship isn't that critical that it becomes that big an issue, you know. Usually the relationship is stronger when you have got the faith in the people to be able to deliver and you are less likely to be put in that position. So it's not that big a deal really." I2A1 (490)		–	High	

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[a] *TC* = trust-based control; *BC* = bureaucratic-based control; *MC* = market-based control; and *XCYC* = hybrid of *XC* and *YC*.
+ = evidence that the factor mentioned in the heading is present (e.g., evidence of building trust is present, and evidence that the firm wants to retain the incumbent is present).
– = negative evidence is present (e.g., evidence provided indicates that the firm does not want to retain the supplier after the contract has ended).

APPENDIX E

MEASUREMENT OF OTHER EXPLANATORY VARIABLES

Asset Specificity

Questions relating to asset specificity were developed to capture the difficulty of transferring the outsourced activity to a different supplier, and the reasons for this difficulty (see instruments adopted in: Young-Ybarra and Wiersema 1999; Reuer and Arino 2002; Dekker 2008; Anderson and Dekker 2005). The cases are categorized into three groups with low (n = 8), medium (n = 8), and high asset specificity (n = 37) based on: (1) requirements for specialized equipment, skills, and industry-specific or firm-specific knowledge; (2) investments in infrastructure and knowledge transfer processes; and (3) number of suppliers that qualify.

Power Asymmetry

In line with the studies that proxy for power asymmetry using net dependence, respondents were asked to discuss the dependence of their firms on suppliers and *vice versa* (Provan 1980; Frazier 1983; Anderson and Dekker 2005). Probing questions were derived from three widely used measures of dependence asymmetry in Rokkan and Haugland's (2002) study. The dependence of the firm on their supplier and *vice versa* is first independently evaluated, followed by net dependence. However, power asymmetry is found to exist in only 12 cases.

Number of Existing Ties

The number of existing ties is measured by the number of contracts between the outsourcing firm and its supplier. In line with Young-Ybarra and Wiersema (1999), the results obtained do not provide conclusive evidence that the number of ties create exit barriers that reduce the ease of switching suppliers.

Summary of the Number of Additional Existing Ties in the Sample[21]

No. of Additional Ties	No. of Cases
0	35[a]
1 to 2 ties	6
> 2 ties	2
At a global level[b]	3
No information provided	7
Total Sample	53

[a] In two cases, more than one division is outsourcing to the same supplier under the same contract.
[b] For this category, suppliers have other outsourcing arrangements with related companies of the firm.

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[21] The notes in this table highlight that some related parties of firms have entered into outsourcing arrangements with the firm's supplier (i.e., related-party contracts). These related-party contracts are viewed as weaker ties than those between the firms and their suppliers (i.e., indirect tie) because they are formed between the group of companies and the specific supplier that each firm is transacting with (i.e., formed at a hierarchical level above the outsourcing firm). Nonetheless, there are similar incentives for the group to continue with the alliance. The parent company is also likely to recommend, or develop policies to ensure, that all firms in the group transact with specific suppliers.

Prior Experience—Alliance Experience and Partner Experience
Summary of the Length of Prior Experiences in the Sample

Length of Prior Experience	**No. of Cases** **Alliance Experience**	 **Partner Experience**
0	10	22
< 5 yrs	9	4
5yrs to < 10 yrs	12	8
> 10 yrs	10	7
Exists but exact period not specified	8	6
No information provided	4	6
Total sample	53	53

Alliance experience and *partner experience* are proxied by the length of relevant prior relationships. The length of prior relationships is estimated as the time period from the commencement of the first relevant contract to the completion of the contract entered into just before the contract of interest.

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BOOK REVIEWS

Stephen A. Zeff, Editor

Editor's note: Two copies of books for review should be sent to the Book Review Editor: Stephen A. Zeff, Rice University, Jesse H. Jones Graduate School of Business, 6100 Main St., Houston, TX 77005. The policy of *The Accounting Review* is to publish only those reviews solicited by the Book Review Editor. Unsolicited reviews will not be accepted.

CHRISTOPHER S. CHAPMAN, DAVID J. COOPER, and PETER B. MILLER (editors), *Accounting, Organizations, and Institutions: Essays in Honour of Anthony Hopwood* (Oxford, U.K.: Oxford University Press, 2009, ISBN 978-0-19-954635-0, pp. xi, 441).

This collection of essays memorializes the life and work of Anthony Hopwood, a thought leader in management accounting research who was renowned for developing communities of accounting scholars. These essays, written by his students, co-authors, and colleagues, were presented to Anthony in a conference of international researchers. Thus, they have benefited from the counsel of the editors, from vigorous discussion among conference participants, and from reactions by Anthony himself. Consistent with Anthony's distinguished career, in what may be his final research endeavor he contributed to the creation of a collection of serious scholarly works, worthy of consideration by all accounting researchers.

The volume is comprised of 18 chapters that collectively cover themes that animated Anthony's work. Chief among these is the importance of studying accounting in the organizational and social contexts in which it operates, with an aim of understanding how accounting shapes and is shaped by its environment. In the introductory chapter, the editors delineate a tripartite schema of accounting, organizations, and institutions that guided their commissioning of pieces for the volume. Given the title of the journal that Anthony founded and edited for decades, *Accounting, Organizations and Society* (*AOS*), I wondered why the authors chose "institutions" over "societies" as the third element of the framework. In particular, I was curious about whether Anthony might in hindsight have preferred this, acknowledging the growing importance and use of institutional theory in accounting research. While the authors acknowledge the limitations of adhering too literally to the framework in light of indistinct conceptual boundaries (i.e., "to what extent is accounting itself an 'institution'?", p. 2), they nonetheless argue convincingly for the usefulness of the framework in understanding a significant body of research that has been published in journals such as: *AOS*, *Critical Perspectives on Accounting*, and *Accounting, Auditing and Accountability Journal*. In Chapter 1, the editors provide a nice history and synthesis of these works. Although Anthony clearly played a major part in the genesis and intellectual development of the literature, the chapter is not a biographical sketch. It locates Anthony's contributions in relation to other management scholars and in the context of current events and influential practitioner-led studies.

The editors conclude their history by reiterating Anthony's concern: that much of the current-day neglect of accounting by social scientists stems from new modes of accountability in higher education that have been made operational through simplified, standardized performance metrics. Their hope is that these essays from "within and beyond" the discipline of accounting will reinvigorate research on accounting in its social context, and thereby address Anthony's apprehension that "the only consumers of accounting research are other accounting researchers" (p. 22). Opting for a mix of "depth" strategy and "breadth" strategy for this review, I have selected one of the 17 contributed chapters for extensive comment and two others for brief summary.

Birnberg and Shields' Chapter 6, entitled "Organizationally Oriented Management Accounting Research in the United States: A Case Study of the Diffusion of a Radical Research Innovation," is the only chapter that

I read in early draft form. Interesting on its first read, the essay is even better after revision following the conference. The authors' novel approach to presenting Anthony as an innovator and examining his life's work through an academic lens of innovation diffusion is fascinating. Like Chapter 1, this is not a simple biographical sketch. The authors collect data from primary sources: Anthony, his co-authors, colleagues, and students. However, rather than simply assemble and present "the story," the authors turn a critical eye on Anthony as innovator—one who sought "a change in the orientation and location of management accounting research" (p. 112). They argue that focusing on the constrained setting of North America provides a strong test of their hypotheses, because the entrenched orientation of North American management accounting research in the 1960s (i.e., analytical and experimental methods) was a formidable barrier to innovation.

According to this framing, Anthony confronted five challenges in bridging the "gaps" that separate the audience of potential "adopters" from the innovation: an engagement gap, a help gap, an openness gap, a results gap, and a time gap (p. 116). These "gaps" reflect risks of adopting a new mode of scholarship—threats to diffusion—that are particularly acute against the backdrop of the typical career progression of a successful North American scholar. After briefly recounting how Anthony came to be an "innovator" through his studies at the University of Chicago, Birnberg and Shields analyze Anthony's four-part approach to diffusing his innovation through his own research: his continued ties with U.S. researchers, founding and editing *AOS*, and the *AOS*-sponsored topical research conferences that he convened.

Anthony's published research raised two related points; first, that accounting and its social context are interdependent and, second, that interdependence implies studying accounting *in situ*. The authors discuss papers that cite Anthony's work as well as indirect evidence of influence—the increased use of field-based research methods. The published research reached a broad audience; however, Anthony also maintained close ties with faculty members in the U.S. and cultivated new associations as a regular participant in U.S. conferences and visitor at U.S. universities. Personal engagement provided Anthony a platform for articulating, advocating, and defending the merits of the innovation. Finally, the authors identify the founding of *AOS* and the focused research conferences that the journal sponsored as the most effective diffusion vehicle. Not simply a mouthpiece for Anthony's ideas, the journal provided "a forum for sharing new ideas about accounting from a *variety* of theoretical and research-method perspectives across national boundaries" (p. 126). Importantly, the journal enlisted a world-class editorial board that included scholars in sociology, psychology, and political science as a means of establishing the journal's validity among non-accounting scholars.

After reviewing evidence on the results of Anthony's diffusion efforts, the authors conclude by noting that, in spite of some success, the dominant forms of management accounting research remain analytical and experimental research. Within the U.S., Anthony's research, his personal ties, and the availability of *AOS* as a respected publication outlet influenced a set of scholars (so-called "early adopters" and "opinion leaders") who were successful in establishing a "beachhead" in mainstream North American journals. However, the breadth of adoption did not rival that of Europe. Returning to the threats to diffusion of innovation, the authors argue that all five "gaps" are evident in the accounts of history offered by early adopters. Young scholars feared that field-based research that used novel theory would not meet with senior faculty support, would be more time-consuming than traditional modes of research, would lead to experiences of disparagement or isolation by peers, and would face diminished publication prospects.

Reflecting on the authors' analysis and respecting their decision to limit the study to North American research, two opportunities occurred to me for extending the analysis. The authors apply the "gap" analysis to the overall diffusion of Anthony's proposed approach to research. However, it seems that the communication vehicles that were employed differ in the potential to address each of these gaps. For example, the launch of *AOS* seems particularly suited to remedying a "results" gap, because it provides a new outlet that is hospitable to the types of research in question. Similarly, Anthony's personal relationship with U.S. scholars seems to address quite directly the "engagement" and "help" gaps. However, neither of these communication vehicles addresses the "time" gap caused by increased demands of field-based research. In that four vehicles for diffusion are presented, it might have been useful to consider how each vehicle addresses one or more "gaps" and to seek evidence supporting or refuting the efficacy of each tool in relation to the gaps that it is best suited to address.

In a related vein, although the study is limited to North America, an obvious question when the authors contrast the modest diffusion of Anthony's research approach in North America with more robust adoption in Europe is whether the "gaps" were smaller, the diffusion tools more effective, or whether additional/different tools were employed. With a tighter framework linking the "gaps" to the four communications devices, it may have been possible to include a comparative analysis of North America and Europe without conducting a parallel review of the literature (which is understandably too great a scope for an essay). Specifically, it may have been possible to compare the two scholarly communities in terms of extant gaps at the time of Anthony's work. This might shed light on alternative explanations for differences in the rate of diffusion.

Overall, I found the Birnberg and Shields essay both informative and provocative. We are regularly exhorted to push the frontiers of accounting knowledge. The unstated presumption is that good ideas "rise to the top" and gain a following by virtue of their innate excellence. It was fascinating to read about someone who challenged the *status quo* and to consider the authors' premise that the success of Anthony's efforts is derived in equal parts from compelling ideas and from having a purposeful strategy for disseminating them.

I turn now from a close look at a single essay to a broad-brush commentary on two essays that expanded my thinking about accounting research and enriched my understanding of Anthony's contributions. Samuel, Covaleski, and Dirsmith's essay, "On the Eclipse of Professionalism in Accounting: An Essay," provides a fascinating history of the "professions" and "professionalism." The authors hypothesize that we are entering a new (seventh) moment in the history of the accounting profession in which "The spreading regime of numerical governance then appears as a correlate to the eclipse of professionalism. Accordingly, the continued spread of accounting and audit techniques could well reflect that moment in which the professions are once again identified with occupations" (p. 387). The authors posit that "the professions serve as a ballast that keeps liberal-democratic ideology afloat" (p. 389) and conclude with provocative questions for future researchers to consider: "What will be the source of political legitimacy for expert rule should professionalism be permanently eclipsed? What legitimizes the accountants once accounting becomes an industry?" (p. 389).

The essays in this volume were written against the backdrop of the collapse of world markets. The questions posed in Samuel et al.'s essay are particularly salient as governments turn from "stimulus" to "austerity" programs to regain a sound economic footing. Reading this essay with an updated perspective, it certainly seems likely that, with politicians' increased reliance on accountants to summarize the effects of various policy options, a shift from "professionalism" to "numerical governance" could polarize debate.

A second essay is equally timely in its consideration of the recent interest in the "convergence" and harmonization of differing national accounting standards in international financial accounting standards. Power's essay, "Financial Accounting without a State," takes up Hopwood's skepticism that nations are the primary units of analysis for evaluating systems of financial accounting and that research aimed at uncovering national barriers to "convergence" is productive. Power argues that "The key conceptual structures of financial accounting (income, expenses, assets, and liabilities) circulated, evolved, and became more highly rationalized at a non-state and transnational level *before* they were ever an object of explicit 'national' interest" (p. 325). Following Teubner (1997), he surmises that "nationality" is an artificial classification of accounting systems that are connected to one another through history and the development of regulatory practices (p. 328). The rise of "national" accounting and the conflict portrayed between these standards and "international" standards is traced to accounting standard setters and other policy actors who sought to validate and establish authority over the accounting rules. The arguments revolved around differing expertise rather than national interests (p. 326).

With this revision of viewpoint, Power argues that researchers should give less attention to differing standards of accounting and more to the systematic processes that support standard setting; specifically, "researchers need to explore how and why accounting in different places ever looked similar in the first place" (p. 337). Echoing the themes of the first chapter of the volume, Power concludes that examining processes of institutional transfer and diffusion should guide future research.

Although I have no great familiarity with the history of accounting standard setting and Power's arguments are new to me, I find the arguments interesting. Reflecting on my own field of management accounting and control, I am reminded of a sophisticated cost accounting system that dated from the late 1800s in a shoe manufacturer in what is now the Czech Republic. Following Power's reasoning, we should focus on the circumstances of the Czech firm in the late 1800s and firms in North America in the late 1900s that adopted activity-based costing, to understand the genesis of their similar approaches to costing. However, rather than treat these in geographical isolation, we would consider the dynamics of diffusion that may have occurred when the original Czech firm relocated to Canada during World War II and subsequently shifted to its current headquarters in Switzerland. In sum, I find Power's new perspective both interesting and potentially useful in a broader sense than the financial accounting standards that he discusses.

There are several audiences for this collection of articles. Perhaps the audience that will take the most pleasure from the collected works is that with personal ties to Anthony: the many students, co-authors, and colleagues whose lives were touched by him and his work. The contributors are a wonderfully representative sample of this group, but there are many others who will enjoy reflecting on Anthony's accomplishments. I count myself in this group. In reading the collection, I gained a greater appreciation for Anthony's reach and influence on accounting research in its varied forms; the volume is indeed a "gestalt" of Anthony's work.

Another audience for this collection is the modern accounting scholar who, by virtue of the organizational systems and institutions of academia that are well chronicled in Anthony's recent writings, specializes in some small corner of the field. By bringing together authors from inside and outside of accounting, from different methodological and disciplinary traditions, and who consider different features of accounting, this volume offers readers an efficient means of becoming informed about contemporary developments in areas different from their own field of specialty. Gathering a distinguished set of authors and focusing them on the task of reflecting on their areas of specialty in the context of Anthony's life work provides readers with an unparalleled opportunity to "sit at the feet of the masters."

Finally, an obvious audience for this collection is doctoral students and others who seek a comprehensive overview and sampling of contemporary research on the interface between institutions, organizations, and accounting. This audience will, however, face considerable challenges in deriving maximum benefit from the collection. If I would offer one criticism of the volume, it is that the editors have provided little structure to the collection. The preface makes clear that the intent of the volume is to serve as "testimony to [Anthony's] intellectual influence and widespread respect throughout the social sciences" (p. xi), and it has successfully discharged this mission. Those who knew Anthony will recognize that the commissioning of authors reflects superb editorial discretion in fully representing an astounding breadth of accounting issues, disciplinary and methodological diversity, associations with Anthony, and "periods" within Anthony's own progression as a scholar. However, I fear that those who did not know Anthony will not appreciate each chapter's contribution to the broader frame of the volume. In their defense, the editors may have been reluctant to impose any structural lens on the collection, preferring to allow the reader (or a faculty member who might guide doctoral students through the volume as part of a structured course) to infer these connections. For my tastes, I would have preferred the editors, all highly esteemed scholars in their own right, to share their views on how the pieces collectively present a modern "take" on the issues that animated Anthony's work. The first chapter of the volume, which is contributed by the editors, provides a wonderful overview of that work and hints strongly at the logic behind the selection of commissioned authors, but it leaves the interpretation and synthesis of the collected works to the reader.

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DALE L. FLESHER, *Gerhard G. Mueller: Father of International Accounting Education* (Bingley, U.K.: Emerald Group Publishing Limited, 2010, ISBN 978-0-85724-333-1, pp. x, 222).

A biography, the title of which anoints its subject as the "Father of International Accounting Education," raises two immediate questions. First, what exactly is international accounting and, second, what does it mean to be a "father" of an educational discipline?

The first question arises because it is not obvious as to what is international about international accounting. After all, the underlying concepts of accounting, like those of physics, are universal. The principles of accounting articulated by Fr. Luca Pacioli (often referred to as the "father of accounting") are no more confined to the boundaries of Italy than are the principles of physics described by Galileo. Yet it is doubtful that any academic physicists consider themselves specialists in "international physics." "International accounting" is, at best, an ill-defined sub-discipline of accounting. To many—and probably to most U.S. accountants—international accounting is mainly a description of accounting practices in countries other than the United States. Needless to say, that definition would be unlikely to be embraced by our colleagues in those "other" countries. To others, international accounting deals primarily with measurement and reporting issues involving currency translation and related issues of consolidation. To still others, it pertains to the unique problems of controlling and auditing the accounting systems of multinational enterprises.

In his biography of Gerhard G. Mueller, Professor Dale L. Flesher never explicitly answers that first question. Yet it is apparent from the extraordinary length and breadth of Mueller's publications that international accounting incorporated almost anything that involved entities outside of the United States. Indeed, he himself defined international accounting as "the producing, exchanging, using, and interpreting of accounting data across national borders" (p. 45).

As for the second question, what it means to be the "father" of international accounting education, Flesher concedes that Mueller was certainly not its biological father; others both wrote about and taught international accounting prior to him. But he leaves no doubt that Mueller adopted the discipline and can take credit for nurturing it up to adulthood.

Writing a biography of an academic accountant is no easy task. Few academic accountants live the types of lives about which exciting or titillating stories can be told. They typically grow up in a middle-class environment, go to college, go to graduate school, perhaps work for a corporation or CPA firm, and accept an academic appointment in a college of business. They tend not to have sordid affairs with celebrities; they neither lead troops into battle nor engage in dramatic undercover operations. Rather, their eminence rests mainly on what non-accountants would consider esoteric tomes and articles in academic and professional journals.

Fortunately for Flesher, Mueller's life, or at least his youth, was not only unconventional, but also ready-made for dramatic story-telling. Mueller was born in 1930 in the rural village of Eineborn, Germany, and his early years were quite pleasant. He grew up on a family farm and was a conscientious student. The outbreak of war in 1939 ended his idyllic childhood. Owing to economic difficulties, his family was forced to relocate to a different town, and at the behest of his parents Gerhard moved in with his grandmother so as to attend a select secondary school. The war years proved difficult, and Gera, the town in which he now lived, was a significant target of Allied bombings. As Flesher relates, at first residents would head for air raid bunkers as soon as warning sirens sounded. Then, however, as the raids became more routine, they would wait in bed until the first bombs exploded, go to a building cellar, and hope for the best. "Class time in school also dwindled. After each air raid, schoolboys were detailed the next morning to help clear streets, dig for survivors, and assist victims. Several classmates suffered injuries doing this, and one died when a damaged building wall collapsed" pp. 22–23).

Despite the difficulties of war and the Allied occupation of the East German area in which he lived, Gerhard graduated from high school in the summer of 1947. Along with two classmates, he decided to flee through the Iron Curtain into the western zone. This would be no easy task. The occupying Red Army would shoot anyone making an escape, and the Americans returned to their place of origin anyone they caught crossing the border. To get to the west, the three youths did the sorts of things of which movies are made. They bought train tickets for a circuitous route to the border so as not to arouse suspicion, hid in an "evil smelling" cow barn, hiked in the middle of the night through forests, carefully skirted Soviet searchlights, and made the types of navigational errors that could have proved deadly.

Young Gerhard took refuge with an uncle who lived in the British occupied zone. His uncle arranged for him to start a formal farm management training program, and eventually he qualified as a certified agricultural journeyman. Soon thereafter, he got a major break. He was accepted in a program that sent 18-year-olds to the United States to expose them to the American way of life. Once in the United States he was placed with a family in Bakersfield, California. He quickly became its adopted son and remained so for the rest of his life. Upon the termination of the program, Gerhard returned to Germany but decided that his future lay in America. He promptly applied for an immigration visa, and in less than two years was back in the States.

Upon his return to the U.S., Mueller found employment with a California chemical supply company and enrolled in a local community college. From there it was undergraduate, M.B.A., and Ph.D. programs at Berkeley. Not surprisingly, his dissertation was internationally oriented, entitled, "Accounting Practices in Six European Countries." In 1960, before he had completed his dissertation, he accepted a teaching position at the University of Washington. Other than leaves at other universities (several overseas) or with CPA firms, he remained at Washington until 1996, when he left to become a member of the Financial Accounting Standards Board.

Flesher's idiosyncratic manuscript (Volume 13 in the series, "Studies in the Development of Accounting Thought") is part biography (and, more specifically, a hagiography), part anthology of previously unpublished articles and personal papers, and part lists of publications and other accomplishments.

Flesher provides persuasive evidence that Mueller has had a major influence on both the teaching and practice of international accounting and is worthy of a biography. Whereas in today's academic environment 14 multiple-authored journal articles would generally be considered sufficient to earn promotion to full professor, Flesher's appendix lists 14 *pages* of articles and books. Although there may previously have been a smattering of international-oriented topics incorporated in a typical accounting program, Mueller in 1964 was the first professor to offer a graduate level course devoted exclusively to international accounting. More importantly, he influenced international accounting education through his books and his advocacy efforts. His books include 19 titles in at least 25 editions, several of which have been translated into multiple languages. His textbooks include *International Accounting* (first published in 1967), *Readings in International Accounting* (1969), and *Accounting: An International Perspective* (first published in 1987).

Mueller promoted international accounting in two related ways. First, he wrote extensively about the significance of international differences, stressing their importance to both the CPA profession and corporations that engage in international trade. Second, he wrote and lecured about why accounting programs need to incorporate international topics in their curriculum. "I strongly feel that graduate accounting education is remiss when it confines itself to the limited scope of the single-country situation" (p. 46), he wrote in a 1965 *Accounting Review* article—a sentiment that today seems almost trite, as schools are falling over themselves to determine how best to integrate IFRS into their courses, but this was certainly uncommon in the mid-1960s.

Mueller was the exemplar of the successful, well-rounded academic of his generation. Active in the American Accounting Association, he was its president in 1988–1989. Astoundingly, he served concurrently as the president of the Washington State Society of CPAs. At the University of Washington he served as acting dean, as senior associate dean, and as department chair. Perhaps more notably, he was also a mentor to untold students and faculty alike (a fact that can readily be verified by discussions with his faculty colleagues at the University of Washington).

Upon retirement from the University of Washington in 1996, Mueller began a new career as a member of the Financial Accounting Standards Board (FASB). Although initially warned by the board chairman to stay away from international topics because that was the province of another member, he nevertheless played a key role in encouraging cooperation with the standard-setting boards of other countries and in promoting research into international issues.

Gerhard G. Mueller: Father of International Accounting Education has its bizarre features. Chapter 1 provides an overview of Mueller's career. But paragraph after paragraph appears word for word in later chapters. As the famous Yankee catcher Yogi Berra has remarked, it was "déjà vu all over again."

Flesher obviously likes lists. In addition to the list of publications, there are lists of Mueller's doctoral students, of invited papers, of seminars and university addresses, of every FASB pronouncement issued during his term on the board, of every speech and paper while at the FASB. Moreover, there are reprints of such trivia as the appointment schedule for his visit at the University of Lagos and the announcements of his lectures at various other African universities. Also, Flesher has a predilection for lacing his manuscript with numerous quotations from friends and colleagues congratulating Mueller on one accomplishment or another.

Flesher also likes (quite understandably) his subject. Thus he writes unabashedly, "He had no idea, however, that the career he was preparing for would someday take him to the heights of the accounting profession and make him a legend in accounting education circles" (p. 40). And when he finally became a standard setter, "he had reached 'rock-star' status in the world of accounting" (p. 155). Where is an editor when needed?

A random sample of three assistant professors in the accounting department of a major university indicated that none of the three had ever heard of Gerhard Mueller. Perhaps that is because Mueller was not, by his own admission, an "empirical" researcher. Accounting fame, this indicates, is fleeting. That, of course, is precisely why volumes of the type produced by Flesher are needed and why the academic community owes him a debt of gratitude. Our discipline has a rich intellectual tradition, unbounded by any single style of research. If for no other reason than that many of the issues addressed by Mueller and his contemporaries will be as relevant in the future as they were in the past, we suffer a profound loss when we permit it to lapse into the oubliettes of history.

Flesher's treatise leaves one significant question unanswered: Why has Gerhard Mueller not yet been elected to the Accounting Hall of Fame?

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JOHN FLOWER, *Accounting and Distributive Justice* (New York, NY: Routledge, 2010, ISBN 978-0-415-87177-8, pp. 201).

Already, in the first sentences, the reader gets a taste of the scope of the book:

> In this book, I challenge the current paradigm of accounting—more precisely the paradigm that underlies the financial reporting of firms. I reject the current paradigm and propose a radical alternative. (p. 1; footnotes omitted)

Arguably, such a start of a book increases the reader's curiosity. The book joins the (ever) ongoing debate of the role of accounting in society and reminds us that accounting is no innocent device merely to mirror the firm's performance. Accounting problems are not only of a technical nature. Rather, accounting standards and accounting practice are set within a dominating ideological logic that guides what we consider "correct accounting." This book suggests that all (financial) accounts build on a neoliberal ethos that can (and should) be questioned and changed. The means by which this book problematizes, as well as suggests solutions, is by investigating the societal problems through some grand ideologies (like Marxism and Libertarianism). These are used to highlight how reporting interplays with ideas of, e.g., liberty and equality. This ambition, to use theoretical resources from "far away places" and "distant times," should be commended, not least since it is in line with the author's ambition: "My sincerest wish is that it [the book] makes them [my fellow accountants] think more profoundly about their discipline" (Preface).

John Flower is a former accounting professor at the University of Bristol, and former Director of the Centre for Research in European Accounting in Brussels.

The book is divided into eight chapters. The first chapter revisits some of the earlier arguments of current societal problems. Two themes are presented. First, the author takes the stand that there is no need for more output (if we want to achieve a better world) and, second, the author suggests that a striving for economic growth risks exhausting the world's resources and degrading the world's environment. This, in turn, the author argues, is an accounting challenge because accounting is a means to report the output.

The present regimes, the book reports, have framed financial reporting in a neoliberal paradigm in which there is no reference to any other motivation than to maximizing profits. The question posed in Chapter 1 is whether there is another ethos that may be applied to go beyond the single-minded focus on financial reporting for profit maximizing. The ambition of the book is presented: To develop financial reporting so that it assures a just and fair distribution of output.

Chapter 2 provides the reader with a definition of distributive justice, i.e., the core idea of this book. This definition is then discussed through a short, but highly informative, description of some prevailing theories:

Egalitarianism, Libertarianism, Marxism, Utilitarianism, and "Justice as Fairness" (i.e., building on John Rawls). Chapter 2 concludes that, with reference to philosophers discussing liberty and equality, the ambition to achieve distributive justice is appropriate: that society's aim should be to achieve a just and fair distribution of wealth and output.

In Chapter 3, the idea of distributive justice is juxtaposed with the idea of the firm. In essence, the chapter develops an argument that the firm has a moral obligation to strive for distributive justice. This, in turn, leads to a discussion of to whom this moral obligation is directed, and by returning to philosophy and, in this case, Immanuel Kant's categorical imperative, the author holds that the firm's obligation is to all stakeholders. Accounting, or rather reporting, returns to focus in Chapter 4. The main message in this chapter is that reporting is linked to the way in which the firm can support the distributive justice: "[Financial] reporting can and should make a significant contribution towards the achievement of distributive justice by the firm" (p. 72).

In Chapters 5, 6, and 7, the focus is on reporting. In sequence, the three chapters relate to: (1) The reporting function of accounting, (2) the distribution function of accounting, and (3) the information function of accounting.

The reporting function relates to the possibility that accounting would report on more than one issue and to move the issue of transparency beyond the narrow view of the current accounting regime. The reporting function is presented in Chapter 5, which is the most developed chapter in the book. The chapter is followed by 28 pages of appendices, including a presentation of GRI (Global Reporting Initiative) reporting, a practical example from a sustainability report (published by the Co-operative Group in Great Britain), as well as a presentation of the current regulations of social and environmental reporting in France ("Bilan Social" and "Les Nouvelles Régulations Économiques").

In Chapter 6, the discussion revolves around the distribution of the output of the firm. This part is similar to the social accounting discourse of the 1970s (see, e.g., Gröjer and Stark 1977). The social accounting agenda, at that time, had an ambition to make visible how the firm's added value was distributed among the different stakeholders (such as tax to the government, salary to the employees, interest to the lenders, etc.). Chapter 6 sharpens the critique against the International Accounting Standards Board's (IASB) definition of the singular objective of financial reporting.

Chapter 7 takes a different stance, and presents reporting as an enabler for a forward-looking dialogue between stakeholders. This function, the information function of accounting, is inspired by Rawls' ideas of truthfulness, objectivity, equality, just exchange, and prevention of harm. The main idea is that reports may serve as the basis for a different sort of accountability (the reporting function) and as an illustration of how output is distributed to the stakeholder, as well as being an instrument for dialogues between stakeholders as a means to achieve more just decisions.

The book concludes with Chapter 8, in which the author gives some final comments on why accountants should make an effort to achieve a more just and fair distribution.

The merits of this book are also its weaknesses. On the one hand, we are introduced to a number of authors that have influenced the social sciences. This makes the book an interesting introduction for accounting scholars who want to broaden their perspectives on how reporting interplays with society. On the other hand, the book sometimes takes on issues that, to do them justice (sic!), would need to be developed much further as well as include contributions from other accounting scholars who have discussed them (e.g., truthful representation). All in all, however, this book provides an interesting read, because it adds to our knowledge of how we can view reporting in the light of different philosophical perspectives and, not least, because it sets out an interesting personal perspective of distributive justice.

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JAMES D. ROSENFELD (editor), *The Selected Works of George J. Benston: Volume 2, Accounting and Finance* (New York, NY: Oxford University Press, 2010, ISBN: 978-0-19-538902-9, Vol. 2, pp. xviii, 426).

This volume, which is edited by James D. Rosenfeld, the late George Benston's friend and colleague at Emory University, consists of 16 articles arranged consecutively in two parts: nine accounting articles and seven finance articles. I will discuss all nine accounting articles in chronological order. I will then discuss two accounting articles that were omitted from the volume that were more highly cited than eight of the nine accounting articles included in the volume (source of citations: scholar.google.com as of February 10, 2011). Before beginning my discussion of the 11 articles, I opine that George Benston (hereafter, George) was one of the few and last Renaissance men of our profession, making numerous contributions to the accounting, finance, economics, and banking literatures.[1] Indeed, while I focus on his contributions to accounting, George was best known for his expertise in banking, an area in which he was often cited by *The Economist*. As additional evidence of his expertise in banking, George was an Associate Editor of *The Journal of Money, Credit, and Banking*.[2]

Volume 1 of this two-volume collection covers George's contributions to banking and financial services.

INCLUDED ARTICLES

Benston (1966) was an early contribution to the budding empirical managerial accounting literature.[3] George discusses the applications, uses, and limitations of multiple regression analysis. One needs to keep in mind that 45 years ago empirical studies in the accounting literature were few and far between, as a perusal of *The Accounting Review* in the early and mid-1960s will attest.[4] Even today, researchers fail to recognize the technical requirements and limitations of the statistical techniques they use.

Benston (1967) was the first article published in an accounting journal documenting a significant relationship between rates of change of financial statement data (i.e., sales and net income) and rates of change in stock prices. However, while George shows that the relation was statistically significant but not economically significant, the seminal study by Ball and Brown (1968) provided economically significant results one year hence. While all accounting academics are aware of the latter study, Benston (1967) has rarely been cited in recent years, so many accounting academics are unaware of George's key contributions in this area.[5]

Benston (1969) was an early contribution to the accounting and public policy literature. It examines whether or not the Securities Act of 1933 and the Securities Exchange Act of 1934 were cost-beneficial. It finds little evidence of fraud related to financial statements and little evidence of lack of disclosure before the Securities Acts (i.e., many firms traded on the New York Stock Exchange disclosed at least sales, gross profit, and depreciation, and nearly all reported net income and detailed balance sheets with current assets and liabilities).

Benston (1973a) also made important contributions to the early public policy research.[6] Prior to this study, it was commonly alleged that the disclosure requirements of the Securities Exchange Act of 1934 positively impacted the securities traded on the New York Stock Exchange (NYSE). George examines changes in riskiness and returns in the stock prices on the NYSE before, after, and as a result of the Securities Exchange Act of 1934. He finds that neither the residual riskiness of securities nor the percentage of large stock movements was lower after the Securities Exchange Act than before it. George concludes that the disclosure requirements had no measurable positive impact on the securities traded on NYSE; there was little basis for the legislation, there was no evidence that it was needed or desirable, and it raised doubt that more required disclosure was warranted. The message in Benston (1969) and Benston (1973a) is still timely today, as the debate over the type and amount of disclosure that is cost-beneficial continues.

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[1] I am not the first person to consider George Benston a Renaissance man. See the remarks by George G. Kaufman at http://www.bus.emory.edu/georgebenston/Kaufman.html

[2] George was the recipient of the Adam Smith Award of the National Association of Business Economists (awarded jointly to Henry Kaufman and Edward J. Kane). He was Associate Editor of many high-quality journals, including *The Accounting Review, Journal of Accounting and Economics, Journal of Finance, Contemporary Accounting Research*, and *Journal of Accounting and Public Policy*, and he was the American Accounting Association's Distinguished International Lecturer in Latin America in 1980.

[3] This article was the recipient of the American Accounting Association's Competitive Manuscript Award.

[4] The first volume of *Journal of Accounting Research* did not appear until 1963.

[5] Ball and Brown (1968) adopted the more powerful methodology introduced by Fama et al. (1969).

[6] This article, which was not published in an accounting journal, was the most highly cited of any of George's articles. According to scholar.google.com, it was cited 415 times as of February 10, 2011. Unless stated otherwise, all the citations included herein are based on scholar.google.com as of February 10, 2011.

Benston (1973b) discusses the costs, benefits, and differences of two systems of financial disclosure: (1) the United States' reliance on public regulation (Securities and Exchange Commission [SEC]), and (2) the United Kingdom's reliance on private regulation (The Stock Exchange). George concludes that, in many important respects, private regulation is preferable. As examples, unlike a private agency, a public agency cannot benefit from any risks it assumes, so it tends to make rules whose costs far outweigh their benefits. It makes too many regulations, and it fails to remove regulations that it knows are far from being cost-beneficial. This topic continues to be important, as seen by the current interest in such matters as private versus public regulation of corporate governance.[7]

Benston and Mian (1995) examine whether or not the accounting rules in effect for derivatives in the early 1990s impacted firms' behavior by reporting findings of a survey conducted by Chase/Wharton of firms' reasons for not using derivatives as reported in their 1992 financial statements. The authors examine the types of derivatives used and the nature of exposures hedged. They conclude that firms either did not hedge their currency risks effectively or they violated the accounting rules, perhaps by mislabeling or hiding the derivatives used. One of their prescient findings was that a Financial Accounting Standards Board (FASB) proposal to record the market or "fair" value of hedges with its resulting holding gains and losses was likely to make matters worse.

Benston and Krasney (1978) address the issue of why current-value or price-level accounting was much in vogue among academics but was not used by practitioners. One possible explanation was that, in spite of the fact that the data were useful (ignoring their cost), the "public good" nature of accounting information precluded their use. In order to address whether current-value or price-level data were cost-beneficial, Benston and Krasney (1978) surveyed a sample of "sophisticated" investors who can request and legally obtain financial information in addition to firms' publicly reported accounting statements.[8] The authors find that these investors generally do not believe that the benefits of current-value or price-level-adjusted information outweigh costs of providing, obtaining, and using it.

Benston et al. (2006) opine on the SEC's (2003) Study stating that the rules-based nature of U.S. GAAP has generated a mass of detailed rules and guidance, encouraging financial engineering to meet the form but not the substance of GAAP. The SEC's (2003) Study suggested that accounting rules result in less informative and/or misleading financial statements, supporting the SEC's suggestion of moving toward principles-based standards. This view was followed by the FASB's subsequent standard-setting strategy. Benston et al. (2006) opine that standard setters ignore the fact that the format of standards and its content are interdependent, requiring detailed rules governing permissible inputs and applications of pricing alternatives even in an ostensible principles-based regime. Benston et al. (2006) advocate using a "true and fair" override in GAAP standards, especially for rules-based GAAP standards.

Benston (2006) is the last of many articles which George published in the *Journal of Accounting and Public Policy*.[9] According to the journal's website as of February 10, 2011, it is the fifth most highly cited article published in the journal in the last five years.[10] George opines on a proposal which subsequently became FASB Statement 157, *Fair Value Measurements*, on September 15, 2006 (FASB 2006), which established a hierarchy of three fair-value levels, in decreasing order of reliability. George provides a chronological account of Enron's adoption of level 3 fair-value accounting. He states that Enron's early use of level 3 fair-value accounting was not used to mislead investors, but it was subsequently used to inflate net income (and thus increase managers' compensation), to structure transactions to impact cash flow from operations rather than from financing, and to engage in more accounting subterfuges until the entire firm collapsed. He suggests that accounting based on fair values is likely to provide more opportunities to misinform and mislead financial statement users than is available by the use of historical-cost accounting.

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[7] See Brown and Caylor (2006) for a discussion of corporate governance provisions required by the Sarbanes-Oxley Act of 2002 versus provisions mandated by the three major U.S. stock exchanges.

[8] These individuals were investment officers employed by 62 life insurance companies that represented 82 percent of the industry's assets. The response rate was 94 percent.

[9] George was an Associate Editor of *Journal of Accounting and Public Policy* since its founding in 1981 until his untimely death in 2008. He published six articles in the journal, more than he published in any other accounting journal. (He published five articles in *The Accounting Review*.)

[10] See http://www.elsevier.com/wps/find/journaldescription.cws_home/505721/description#description

EXCLUDED ARTICLES

The volume includes nine of George's accounting articles, which, with two exceptions, were published in accounting journals. Nonetheless, it excludes the two most highly cited of any of George's research that was published in accounting articles. I believe that the volume could have benefitted from including these two articles, and I recommend that readers interested in George's contributions to the accounting discipline peruse them.

Benston (1985) was cited 207 times.[11] This article tests a self-serving management hypothesis by examining the personal financial gains and losses of senior managers of 29 conglomerates that engaged in extensive merger activity. The self-serving management hypothesis suggests that managers would increase their wealth even if shareholders' wealth were to decrease. Benston (1985) finds that officer-directors gained and lost personal wealth as their firms' shareholders gained and lost personal wealth because their stock options and stock holdings swamped their remuneration (salary, profit sharing, bonuses, and fringe benefits). George also finds that the top manager-directors of conglomerates with negative stock returns left their positions more often than those of other conglomerates. These findings are inconsistent with the self-serving managerial hypothesis as it was formulated in the early 1980s. The debate regarding whether the managerial power view or the efficient contracting view is more descriptive of the reality of managerial compensation continues today.[12]

Benston (1982) was cited 99 times.[13] This article examines analytically the rationale for, and the techniques of, social responsibility accounting. It finds no support for the fear that corporate managers act contrary to the interests of their shareholders and that managers are unconcerned with those parties with whom the firm contracts (creditors, employees, and consumers). While others may be harmed by firms' actions (externalities), it delineates, analyzes, and rejects the ways in which social responsibility accounting can be used to measure and control externalities. This opinion is very controversial, and the subject is of keen interest, given the global warming debate.

A PERSONAL NOTE

I have known George since 1970, when I was a Ph.D. student and he was a Professor at the University of Rochester. He was a mentor and a friend, a gentleman, and a scholar. I miss him greatly.

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[11] This is the second most highly cited of George's journal articles. It is surpassed only by Benston (1973a).

[12] See, for example, Brown and Lee (2010).

[13] The third most highly cited of George's articles published in an accounting journal (Benston and Hartgraves [2002], with 93 cites) was also excluded from the volume. However, as a precursor to Benston (2006), its exclusion from the volume is unimportant; so I do not discuss it further.

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EDITORIAL POLICY AND STYLE INFORMATION

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According to the policies set by the Publications Committee (which were endorsed by the Executive Committee and were published in the *Accounting Education News*, June 1987), *The Accounting Review* "should be viewed as the premier journal for publishing articles reporting the results of accounting research and explaining and illustrating related research methodology. The scope of acceptable articles should embrace any research methodology and any accounting-related subject, as long as the articles meet the standards established for publication in the journal ... No special sections should be necessary. The primary, but not exclusive, audience should be—as it is now—academicians, graduate students, and others interested in accounting research."

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The Accounting Review's manuscript preparation guidelines follow *The Chicago Manual of Style* (15th ed.; University of Chicago Press). Another helpful guide to usage and style is *The Elements of Style*, by William Strunk, Jr., and E. B. White (Macmillan). Spelling follows *Webster's Collegiate Dictionary.*

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6. The American Accounting Association encourages use of gender-neutral language in its publications.

Pagination: All pages, including tables, appendices and references, should be serially numbered. Major sections should be numbered in Roman numerals. Subsections should not be numbered.

Numbers: Spell out numbers from one to ten, except when used in tables and lists, and when used with mathematical, statistical, scientific, or technical units and quantities, such as distances, weights and measures. For example: *three days; 3 kilometers; 30 years.* All other numbers are expressed numerically.

Percentages and Decimal Fractions: In nontechnical copy use the word percent in the text.

Hyphens: Use a hyphen to join unit modifiers or to clarify usage. For example: *a cross-sectional equation; re-form.* See *Webster's* for correct usage.

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An Abstract of about 100 words (150 maximum) should be presented on a separate page immediately preceeding the text. The Abstract should concisely inform the reader of the manuscript's topic, its methods, and its findings. The Keywords statement should appear immediately below the Abstract. The text of the paper should start with a section labeled "I. Introduction," which provides more details about the paper's purpose, motivation, methodology, and findings. Both the Abstract and the Introduction should be relatively nontechnical, yet clear enough for an informed reader to understand the manuscript's contribution. The manuscript's title, but neither the author's name nor other identification designations, should appear on the Abstract page.

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The author should note the following general requirements:

1. Each table and figure (graphic) should appear on a separate page and should be placed at the end of the text. Each should bear an Arabic number and a complete title indicating the exact contents of the table or figure. Tables and figures should define each variable. The titles and definitions should be sufficiently detailed to enable the reader to interpret the tables and figures without reference to the text.
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1. In the text, works are cited as follows: author's last name and year, without comma, in parentheses. For example: one author, (Berry 2003); two authors, (Fehr and Schmidt 2003); three or more authors, (Dechow et al. 1998); more than one work cited, (Cole and Yakushiji 1984; Dechow et al. 1995; Levitt 1998); with two works by the same author(s), (Nelson 2003, 2005).
2. Unless confusion would result, do not use "p." or "pp." before page numbers. For example, (Dechow and Dichev 2002, 41–42).
3. When the reference list contains two or more works by the same author (as the only author or first of two or more authors) published in the same year, the suffix a, b, etc., is appended to the date in the within-text citations and in the "References" section. For example, (Johansson 2004a, 2004b, 2004c; Baiman and Rajan 2002a, 2002b; Dhaliwal et al. 2005a, 2005b).
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Sample entries are as follows:

Baiman, S., and M. Rajan. 2002a. The role of information and opportunism in the choice of buyer-supplier relationships. *Journal of Accounting Research* 40 (2): 247–278.

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2. For manuscripts reporting on field surveys or experiments: If the additional documentation (e.g., questionnaire, case, interview schedule) is sent as a separate file, then all information that might identify the author(s) must be deleted from the instrument.
3. New manuscripts must be submitted through the Manuscript Submission and Peer Review System, located at http://accr.allentrack.net. The site contains detailed instructions regarding the preparation of files for submission. Revisions of manuscripts originally submitted before June 1, 2011 should be sent via email to the incoming senior editor, John Harry Evans III, at tar@katz.pitt.edu. Please submit separate files for (1) the manuscript's title page with identifying information (not forwarded to reviewers), (2) the manuscript with title page and all other identifying information removed, and (3) any necessary supplemental files, such as experimental instructions and/or response memoranda on invited revisions.
4. A nonrefundable submission fee is required unless explicitly waived by the editor for invited revisions of previous submissions. The submission fee in U.S. funds is $200.00 for members and $400.00 for nonmembers of the AAA payable by credit card (VISA or MasterCard only). The payment form is available online at: https://aaahq.org/AAAforms/journals/tarsubmit.cfm. If you are unable to pay by credit card or have any questions, please contact the AAA Member Services Team at (941) 921-7747 or info@aaahq.org.
5. Revisions must be submitted within 12 months from the decision letter inviting a revision.

COMMENTS

The Accounting Review welcomes submissions of comments on previous *TAR* articles. Comments on articles previously published in *The Accounting Review* will generally be reviewed by two reviewers, usually including an author of the original article (to assist the editor in evaluating whether the submitted comment represents the prior article accurately) and an additional reviewer who is independent of the original article. If a comment is accepted for publication, the original author will generally be invited to reply. All other editorial requirements, as enumerated above, apply to proposed comments.

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The AAA's Executive Committee policy (originally adopted in 1989, and amended in 2009) is that the objective of the Association-wide journals (*The Accounting Review, Accounting Horizons, Issues in Accounting Education*) is to provide the widest possible dissemination of knowledge based on systematic scholarly inquiries into accounting as a field of professional research, and educational activity. To fulfill this objective, authors are encouraged to make their data available for use by others in extending or replicating results reported in their articles.

SEPTEMBER 2011 PLACEMENT ADS

The deadline for free position ads to be included in this section is two months prior to the date of publication. *The Accounting Review* is published in January, March, May, July, September, and November. Position ads in the "Placement Ads" are free with the purchase of a job posting in the AAA Career Center. For more information on how to purchase a job posting in the Career Center and receive your free position ad in *The Accounting Review*, go to the AAA website at http://aaahq.org and click on "Career Center," or call our office at 941-921-7747.

UNIVERSITY OF MISSOURI, Columbia School of Accountancy, is seeking applications for a tenure-track faculty position at the Assistant Professor level for Fall 2012. Candidates for the position must have an interest in Auditing and/or Financial Accounting, and be committed to high-quality scholarly research. Applications are encouraged from experienced Assistant Professors as well as new Ph.D.s or those nearing completion of their Ph.D. Salary and research support are competitive. Application materials including a letter of interest, *vita*, evidence of teaching competence, and a sample of working papers should be submitted online at http://hrs.missouri.edu/find-a-job/academic/index.php Three reference letters should be separately mailed to: Recruiting Committee, School of Accountancy, University of Missouri, 303 Cornell Hall, Columbia, MO 65211. Screening will begin immediately and continue until the position is filled. The University of Missouri is an Equal Opportunity, Affirmative Action Employer. Applications from minority and women candidates are strongly encouraged for this position. To request ADA accommodations, please contact the University's ADA Coordinator at (573) 884–7278 (V/TTY).

FUDAN UNIVERSITY, School of Management, Accounting Department, invites applications for Assistant Professor/Associate Professor/Full Professor of Accounting. The applicant should have a Ph.D. degree or ABD in the related field from a prestigious university, be able to teach undergraduate and graduate courses in accounting and publish at major journals. For Associate Professor or Professor level, applicants should be able to demonstrate excellent teaching and research records. For Assistant Professor level, applicants should be able to demonstrate strong potential for research and teaching. Review of applications will start immediately. Fudan University is one of the top universities in China. We offer competitive salary, research and housing supports. Applicants please submit your *curriculum vitae*, job market papers and three reference letters to: Ms. Yan ZHOU Faculty Office, School of Management, 670 Guo Shun Road, Shanghai 200433 Office: 86–21–65642410 Fax: 86–21–65654523
Email: hrfdms@fudan.edu.cn Website: http://www.fdms.fudan.edu.cn

VIRGINIA COMMONWEALTH UNIVERSITY, Department of Accounting in the School of Business, invites applicants for a full-time tenure track faculty position. Both the School of Business and the Accounting program are AACSB-accredited. Candidates must hold a doctoral degree with a major or primary concentration in Accounting from an AACSB-accredited institution. Salary and benefits are competitive. Excellent oral and written English language skills are required. Candidates must have a record which shows: (a) high-quality research in accounting journals; (b) an on-going stream of research suggesting future contributions of an exceptional nature; and (c) evidence of multidisciplinary research and success in securing external research funding. A professional certification and practical accounting experience are desirable. This position is open to any area of specialization and preference will be given to candidates who are interested in teaching at the doctoral level. Candidates must be eligible for employment in the United States and indicate their citizenship or visa status. Also, the applicant should demonstrate experience working in and fostering a diverse faculty, staff and student environment of the commitment to do so as a faculty member at VCU. VCU enrolls over 32,000 students, with 3,900 enrolled in the School of Business. VCU is located in Richmond, the state capital, which has a thriving business community and an excellent quality of life. VCU is a diverse academic community in which people of all backgrounds are welcomed and accepted. See www.pubinfo.vcu.edu/facjobs for complete details on position number F03530.

LOYOLA MARYMOUNT UNIVERSITY, Department of Accounting, invites applicants for a full-time, tenure-track, faculty position at assistant/associate rank effective Fall 2012. A doctorate in Accounting from an AACSB-accredited university is required. All candidates should demonstrate a strong commitment to scholarly research and excellence in teaching. Candidates with interest in Tax, Cost, and Financial Accounting areas are encouraged to apply. Salary is competitive and research support is available. To learn more about this position, contact Professor Mahmoud Nourayi, at 310-338-5831 or mnourayi@lmu.edu. Loyola Marymount, a comprehensive university in the mainstream of American Catholic higher education, seeks professionally outstanding applicants who value its mission and share its commitment to academic excellence, the education of the whole person, and the building of a just society. LMU is an equal opportunity institution actively working to promote an intercultural learning community. Women and minorities are encouraged to apply. Visit www.lmu.edu for more information.

UNIVERSITY OF DAYTON, Department of Accounting, invites applications for the position of Department Chair. This tenured position at the Associate or Full Professor level begins July 1, 2012, and includes the Ernst and Young Faculty Fellow position. Compensation is competitive. The University of Dayton, founded in 1,850 by the Society of Mary, is a top ten Catholic research university. Separately accredited by AACSB, the accounting program has over 350 undergraduate majors and over 80 fifth year accounting students in our M.B.A. program. More information is available at: http://www.udayton.edu/business/accounting/index.php To attain its Catholic and Marianist mission, the University is committed to the principles of diversity, inclusion, and affirmative action and to equal opportunity policies and practices. We act affirmatively to recruit and hire women, traditionally under-represented minority groups, people with disabilities and veterans. The complete job description, including required and preferred qualifications and the required online application is at: https://jobs.udayton.edu/

MIAMI UNIVERSITY seeks Assistant Professor to teach accounting courses at both the undergraduate and master's level; conduct and publish scholarly research; provide service to the institution, academy, and profession. Require: A doctorate in accounting or dissertation in process with completion of degree by December 31, 2012. Prefer: Professional certification (CPA or similar); relevant professional work experience. Submit letter expressing interest in the position, résumé, and three letters of reference online at www.fsb.muohio.edu/employment/accounting Screening of applications continues until the position is filled. Women and minorities are encouraged to apply. Miami University is an EOE/AA employer with smoke-free campuses and offers full same-sex domestic partner benefits. Right to Know—Consumer Information http://www.miami.muohio.edu/about-miami/publications-and-policies/student-consumer-info/ Hard copy upon request.

ALABAMA STATE UNIVERSITY, College of Business Administration, Department of Accounting and Finance/Master of Accountancy Program, invites applications for an Assistant/Associate Professor of Accounting. This is a nine-month position. The successful applicants will teach upper level undergraduate and graduate accounting courses to include financial and governmental accounting, engage in research and publication, participate in university-wide service and professional activities, mentor, and academically advise students. An earned Ph.D. degree in Accounting from an accredited institution or ABD within one year of completion required; professional certification and research published in refereed journals desired. Apply to this position by visiting www.alasu.edu/hr

BELLARMINE UNIVERSITY invites applicants and nominations for the Fr. Raymond J. Treece Endowed Chairperson of the Department of Accounting. The Chair serves as the administrator of the Accounting Program and engages in teaching, research/scholarly activity, and professional service. The Chair reports to the Dean of the Rubel School of Business. This position is an 11-month, tenure-track faculty position at the associate/full professor rank beginning June 1, 2012. Salary is competitive and commensurate with qualifications. Minimum Qualifications: 1. Doctoral degree in Accounting or JD/ L.L.M., academically/professionally qualified. 2. Record of teaching and scholarship effectiveness commensurate with the rank of Associate Professor. 3. Demonstrated commitment to administrative effectiveness and an ability to interact well with faculty, administrators, students, and the community. A current CPA license is expected for this position. Bellarmine's accounting department has a strong history of excellence with its graduates achieving the highest pass rate on the CPA examination in the Commonwealth of Kentucky, placement of over 30 percent of its graduates with Big 4 accounting firms, and a recent graduate honored for scoring in the top 10 nationally on the CPA examination. The Rubel School of Business is accredited by AACSB International. Bellarmine University is a dynamic, growing university with a strong liberal arts focus in the Catholic tradition. Bellarmine is a Top 100 university in Forbes, is listed in the Princeton Review's 373 Best Colleges and is ranked 12th among southern universities in the U.S. News and World Report. Bellarmine was designated as one of the Best Places to Work in Kentucky by the Kentucky Chamber of Commerce in 2008. In 2009, Bellarmine was named one of the Best Colleges to Work For in the United States. Learn more about Bellarmine at http://www.bellarmine.edu/about/ Screening will continue until the position is filled. To apply please send a current *curriculum vitae*, copies of graduate transcripts, statements of administrative philosophy, teaching philosophy, research interests, and contact information for three references, via email to acctsearch@bellarmine.edu., or mail to Dr. Julie Toner, Bellarmine University, 2001 Newburg Road, Louisville, KY 40205. Bellarmine is an equal opportunity employer. Persons of diverse backgrounds are strongly encouraged to apply.

PENNSYLVANIA STATE HARRISBURG, School of Business Administration, invites applications for a tenure-track Assistant Professor of Accounting in its AACSB-accredited program effective Fall 2012. Doctorate in Accounting or related discipline required; ABDs completing doctorate by August 2012 will be considered. Candidates who have completed graduate degrees at AACSB-accredited schools, preferred. Faculty members are expected to pursue active research, teach 3/2 load first two years then 3/3 load; teach graduate/undergraduate courses in financial accounting with a secondary area of expertise. Opportunity may exist for online course delivery. Strong commitment to effective teaching and publication is required. Professional certification (CPA, CMA) and prior teaching, research, professional experience preferred. Compensation is AACSB competitive. For additional details, please visit our website at www.hbg.psu.edu. Review of applications will begin immediately and continue until position is filled. Send cover letter, curriculum vita and four references to: Accounting Search Committee, c/o Mrs. Dorothy Guy, Pennsylvania State Harrisburg, 777 W. Harrisburg Pike, Box: AAA-34326, Middletown, PA 17057–4898. Pennsylvania State is committed to affirmative action, equal opportunity, and the diversity of its workforce.

CORNERSTONE RESEARCH is interested in hiring full-time and summer associates for its offices in Boston, MA, Los Angeles, CA, Menlo Park, CA, New York, NY, San Francisco, CA, and Washington, D.C. We seek Ph.D. candidates with the ability to apply academic research to real-world issues, present concise explanations of complex analyses, and independently manage projects and junior staff. The ideal candidate will possess a strong empirical background in Financial, Cost, or Auditing, as well as demonstrate excellent interpersonal skills. We also seek experienced candidates for more senior levels. Cornerstone Research is a leading economics and finance consulting firm specializing in analyzing economic, financial, accounting, and marketing issues. Cornerstone Research provides an interesting and rewarding work environment. Associates work directly with esteemed faculty experts in a distinctive "partnership" that combines the strengths of the academic and business worlds. Compensation commensurate with experience. Submit résumé, sample research paper, letters of reference and cover letter that include a statement describing your interest in economic consulting and your location preferences at http://associatecareer.cornerstone.com Recruiting Coordinator-AR Web page: http://www.cornerstone.com

TEXAS STATE UNIVERSITY–SAN MARCOS is seeking the position of Chair for the Department of Accounting Review. Effective Date: September 15, 2011. Closing Date: Open until filled. Appointment Date: July 1, 2012. For information and application procedures, visit http://facultyrecords.provost.txstate.edu/faculty-employment/faculty-employment/2012-2015.htm

OKLAHOMA STATE UNIVERSITY, School of Accounting in the Spears School of Business, invites applications for a position beginning Fall, 2012 at the Assistant, Associate, or Full Professor level. All areas of research and teaching emphasis will be considered. We are especially interested in faculty with a proven research record indicating the ability to publish in "A" level journals. Applicants must have an appropriate earned doctorate and those at the senior level should have a distinguished on-going record of scholarship. All applicants must have a commitment to instructional excellence. The position is located on the OSU/Stillwater campus, but could be called upon to occasionally teach on the OSU/Tulsa campus. Applicant screening will begin immediately and will continue until the position is filled. Interviews will begin in the Fall 2011 semester. All positions are contingent upon available funding. A letter of application, *curriculum vitae*, and a summary of teaching evaluations should be sent to Bud Lacy, Head, School of Accounting, Oklahoma State University, 401 Business Building, Stillwater, OK 74078. Phone (405) 744–5123; email: osu-soa@okstate.edu. Oklahoma State University is an Affirmative Action/Equal Opportunity/E-Verify employer committed to diversity. Please contact us for details.

UNIVERSITY OF DELAWARE, Department of Accounting and MIS, invites applicants for a tenure-track position beginning September 2012. Rank is open. Primary qualifications include outstanding research potential and teaching ability. Preference will be given to candidates with teaching and research interests in one of the following: accounting information systems, cost accounting, financial reporting, or tax. Candidates must hold a doctorate in Accounting or be ABD with completion expected prior to joining. Salary, benefits, and support are competitive with AACSB-accredited schools. Qualified candidates should send names of three references, *curriculum vitae*, and summaries of teaching performance to Eileen Sklodowski at eileens@udel.edu. The application materials shall be shared with departmental faculty. The University of Delaware is an Equal Opportunity Employer which encourages applications from minority group members and women.

SACRED HEART UNIVERSITY, John F. Welch College of Business, anticipates one (1) full-time, tenure track faculty opening in Accounting for Academic Year 2011–2012. The Rank is open and commensurate with experience. The position requires a research doctorate in accounting or a related field. The Welch College of Business is AACSB-accredited. Candidates with excellent teaching records, relevant business experience, and a demonstrated capability to produce scholarly work publishable in refereed journals are encouraged to apply. While all fields in accounting will be considered, preference will be given to candidates with teaching and research interests in Auditing. A "normal" teaching assignment includes evening courses. Sacred Heart University is the second-largest Catholic university in New England. *The Princeton Review* includes SHU in its "Best 371 Colleges: 2010" and *U.S. News & World Report*'s "America's Best Colleges 2010" ranks SHU in the top tier of Master's Universities in the North. Over 6,000 students are enrolled in its four colleges: Arts & Sciences; Education & Health Professions; the AACSB-accredited John F. Welch College of Business; and University College. The Welch College of Business offers degrees in Accounting, Business Administration, Business Economics, Finance, Marketing, and Sport Management. The Welch M.B.A., in addition to being offered in Fairfield, is offered at our Luxembourg campus. Ecumenical in spirit and led by the laity, Sacred Heart University is dedicated to excellence in academics and to the Catholic intellectual and liberal arts traditions. We are looking for individuals who value the University's Catholic identity, tradition, and spirit, and support its commitment to the intellectual and ethical development of our students. Sacred Heart University is an EOE/AA employer. Qualified candidates can also submit a letter of interest, *curriculum vitae*, samples of publications or research papers, student evaluations, and three letters of reference to: Dr. Benoit N Boyer, Chair, Accounting and Information Systems Department, John F. Welch College of Business, Sacred Heart University, 5151 Park Avenue, Fairfield CT 06825 by September 30, 2011. Materials may be emailed to: divisccontia@sacredheart.edu.

WESTERN MICHIGAN UNIVERSITY invites applications for multiple tenure-track positions at the Assistant or Associate Professor level. While all areas will be considered, preference will be given to candidates with interests in Auditing and Tax. Candidates must have a Ph.D. with an accounting major (or ABD with completion by time of initial appointment) from an AACSB-accredited school. Salary is competitive. Teaching responsibilities will be at both the undergraduate and graduate levels. The Department of Accountancy's primary emphasis is on instruction followed by a strong emphasis on intellectual contributions. We encourage faculty to engage in applied research, instructional development, and basic research, in that order. Service that advances the mission of the department is also important. Western Michigan University enrolls approximately 25,000 students. The University comprises six degree-granting colleges, a Graduate College, and an Honors College. The Haworth College of Business enrolls about 4,500 students. Approximately 160 accounting majors graduate each year. The Haworth College of Business and the Department of Accountancy are accredited by the AACSB at both the undergraduate and graduate levels. To learn more about these positions contact: Donald W. Gribbin, Chair, Department of Accountancy, Haworth College of Business, Western Michigan University, Kalamazoo, Michigan 49008–5402. Email: donald.gribbin@wmich.edu. Apply online at http://www.wmich.edu/hr/careers-at-wmu.html Western Michigan University is an Affirmative Action/Equal Opportunity Employer and has a strong commitment to the principle of diversity.

BUCKNELL UNIVERSITY, School of Management, seeks a full-time, tenure-track Assistant Professor of Accounting beginning in the Fall of 2012. A record of excellence in undergraduate teaching and potential to create a body of peer-reviewed scholarship are required. Qualified candidates will have completed, or be near completion of, the Ph.D. or D.B.A. degree. The successful candidate will be able to teach both introductory accounting and upper-level courses in at least one accounting sub-discipline (e.g., financial, managerial, audit). The teaching load for this position is five course sections per academic year. Candidates with post-Ph.D., full-time teaching experience are encouraged to apply and may be granted up to three years of credit towards tenure. Professional experience and certification are desirable. Salary is AACSB competitive. See the online job site at www.bucknell.edu/jobs for a more detailed position description and to submit your application materials.

FLORIDA GULF COAST UNIVERSITY seeks candidates to teach courses in financial accounting and auditing, with a possibility of teaching courses in AIS each Fall and Spring semester as assigned by the

Chair of the Department of Accounting; perform appropriate scholarship and service activities; and maintain status as Academically Qualified based on AACSB International standards on an annual basis. The successful candidate with have a Ph.D. in accounting from a university accredited by the AACSB-I, or its international equivalent, have professional certification, and be of academically qualified status based on AACSB international standards. Knowledge, skills, and abilities to be an effective teacher of auditing and financial accounting and possibly, AIS. Ability to communicate and interact effectively with students, other instructors, faculty, and college administration and stakeholders in the professional community. Contact person: Deborah McNeal at dmcneal@fgcu.edu. Apply to the position by visiting www.jobs.fgcu.edu position number 1386.

UNIVERSITY OF TEXAS AT EL PASO, Department of Accounting, College of Business Administration, seeks applicants for senior Assistant/Associate/Full Professor. Description: Applications are invited for a tenure-track position at the Senior Assistant, Associate, or Full Professor level; start date is Fall 2012. The assignment location is El Paso, Texas. Qualifications: A doctorate from an AACSB-accredited university and a record of accomplishment in publication, teaching, and service. AREAS: Auditing, Taxation. Application Procedure: Submit letter of interest, *curriculum vita* and three letters of recommendation to: Gary Braun, University of Texas at El Paso, 500 W. University Ave., El Paso, TX 79968–0542 or email: gbraun@utep.edu. The University of Texas at El Paso is an Equal Opportunity/ Affirmative Action employer. The University does not discriminate on the basis of race, color, national origin, sex, religion, age, disability, genetic information, veteran status, or sexual orientation in employment or the provision of services.

TEXAS TECH UNIVERSITY, Rawls College of Business, is soliciting applications for a tenure-track position in Accounting (all ranks) to begin Fall 2012, budget allowing. Preference will be given to candidates with a primary teaching interest in taxation at the graduate level and a secondary interest in either undergraduate financial accounting or accounting information systems. Candidates should have a strong commitment to publishing scholarly research in high quality academic journals, demonstrating superior teaching at the undergraduate and master levels, and actively participating in doctoral education. Solicitation of external research funding is also strongly encouraged as the university achieves its goal of becoming a national research institution. Other responsibilities include participation in department, college, and university activities. Candidates must have a doctorate from an AACSB International accredited university. Salary and benefits are competitive. Interested applicants should submit letters of interest, *curriculum vitae*, and list of references, to the Chair of the Recruiting Committee by emailing ralph.viator@ttu.edu, or postal mail to: Professor Ralph Viator, Area of Accounting, Rawls College of Business, Texas Tech University, Lubbock, TX 79409–2101. Review of applications will begin immediately and continue until the position is filled. The Rawls College of Business is an Equal Opportunity Employer. Women and minorities are encouraged to apply.

UNIVERSITY OF NORTH DAKOTA is seeking applicants, with rank commensurate with qualifications, for a tenure-track position in Accounting beginning August 2012. A Ph.D. or D.B.A. with an accounting concentration or a Ph.D. in another field with the CPA designation or graduate level coursework in accounting is required. ABD will be considered for the position provided that the degree will be completed in time for the appointment beginning in Fall of 2012. The primary teaching need is financial accounting. All applicants must be able to demonstrate a commitment to both teaching and research, and be academically qualified in accordance with AACSB standards. Professional certification is desirable. The College of Business and Public Administration is AACSB-accredited at the undergraduate and M.B.A. level. Salary dependent upon qualifications. Forward letter of application, *curriculum vitae*, and the names, addresses (email acceptable) and telephone numbers of three references to: Professor Steve Carlson, Chair, Department of Accountancy, 293 Centennial Drive Stop 8097, Grand Forks, ND 58202–8097.

Applications are accepted until the position is filled. UND does not discriminate on the basis of race, color, national origin, sex, religion, age or disability in employment or the provision of services. UND is an Equal Opportunity/Affirmative Action Employer and women and minorities are encouraged to apply.

KENT STATE UNIVERSITY, Department of Accounting, invites applications for a tenure-track position at the Assistant, Associate or Full Professor level beginning Fall 2012. We are primarily interested in candidates with teaching and research interests in Auditing. Candidates must have a Ph.D. with a major in accounting or an appropriate related field. Professional certification such as a CPA or CMA is highly desirable. Research will be expected in high-quality, academic refereed journals; service on doctoral students' dissertations will be part of the faculty member's responsibilities. Candidates for an Associate or Full position must have an established scholarly record. Review of applications will begin immediately and continue until the positions are filled. Applicants should provide a cover letter and *curriculum vitae*. In addition, applicants will be required to apply online at: http://jobs.kent.edu Search for posting #998726. Kent State University is an affirmative action/equal opportunity employer. Applications should be sent to: Contact: Professor Mark Altieri, Chair Faculty Recruiting Committee, Department of Accounting, Kent State University, P.O. Box 5190, Kent, OH 44242–0001. Email: maltieri@kent.edu.

NORTHEASTERN UNIVERSITY is seeking applications for tenure-track positions effective September 2012, at the Assistant or Associate Professor rank. Candidates must have or expect to have a doctorate in accounting or a closely related business field before the start date of September 2012 and be committed to excellence in research and teaching. The Accounting Group at Northeastern is nationally recognized for its high quality behavioral accounting research focused on auditing, governance, tax, managerial and ethical judgment, and decision making. We provide a supportive environment where collaboration in research and teaching is encouraged. The position offers competitive compensation and teaching responsibilities that enable a significant level of high impact research. Rank and salary are dependent on qualifications. Summer funding, graduate assistants, and travel support are available. Accounting courses are offered at both the undergraduate and at the graduate levels (M.B.A., M.S./M.B.A., M.S.A., and M.S. Tax). For optimal consideration, submit your cover letter, *curriculum vitae*, and two samples of scholarly work at http://www.cba.neu.edu/faculty/ Click on the "Faculty Positions" link in the upper right corner. If you have any questions, please contact Dr. Ganesh Krishnamoorthy via email at g.krishnamoorthy@neu.edu. Northeastern University is an Affirmative Action/Equal Opportunity/Title IX Employer and welcomes applications from minorities, women, and persons with disabilities.

WASHBURN UNIVERSITY, School of Business, invites applications for an Assistant or Associate Professor of accounting to begin Fall 2012. Preference given to candidates with Ph.D. completed; ABDs considered if substantial progress has been made toward completion of the dissertation. Teaching responsibilities at the undergraduate and M.B.A. levels may include the areas of financial, managerial, and cost, systems, or auditing. The ideal candidate will have demonstrated excellence in teaching and commitment to scholarship and service commensurate with AACSB International accreditation. Competitive salary dependent on qualifications and experience. Application review begins immediately and continues until position is filled. The School of Business is AACSB-International accredited and serves more than 700 BBA and M.B.A. students. Applicants should submit a letter of application, current *vita* with names of three references, transcripts of all graduate work, summary of teaching performance, and copies of recent scholarly work to Chair, Accounting Position Search Committee, School of Business, Washburn University, 1700 S.W. College Avenue, Topeka, KS 66621. Employment at Washburn University may be conditioned upon satisfactory completion of a background check. Washburn University is an Equal Opportunity Employer. Candidates from under-represented groups are encouraged to apply. Please visit www.washburn.edu/business for more information.

WASHBURN UNIVERSITY, School of Business, invites applications and nominations for a professor in accounting to hold the William Lyman Dibble Professorship to begin Fall 2012. The successful candidate will demonstrate (1) excellence and enthusiasm in teaching financial accounting and related areas, (2) current and relevant experience in the accounting field through scholarship, consulting, or extensive work in the profession, (3) local or national credibility in industry and academia, (4) a Ph.D. in accounting, or a Masters degree and significant senior-level executive experience in the accounting area, (5) willingness to help grow and develop outstanding undergraduate and master's level programs in accounting, (6) commitment to scholarship and service commensurate with AACSB International accreditation, as well as an ability to perform faculty leadership roles. Salary is commensurate with experience and qualifications; a substantial support package for research and professional development is available. Submit letter of application, current *vita* with names and contact information of three references, transcripts of all graduate work, summary of teaching performance, and copies of recent scholarly work to: Chair, Dibble Professorship Search Committee, School of Business, Washburn University, 1700 S.W. College Avenue, Topeka, KS 66621. Review of applications will begin immediately, and will continue until position is filled. Employment at Washburn University may be conditioned upon satisfactory completion of a background check. Washburn University is an EOE. Please visit www.washburn.edu/business for more information.

CORPORATE CONTROLLER, Responsible for direct supervision of all accounting and financial reporting functions for multiple entities. Primary responsibilities include supervision of the monthly close process, monthly, quarterly and annual billings to clients for services provided, billing reimbursements from clients, collection of accounts receivable, supervising accounts payable, payroll, monthly reporting for the owner and board of directors, monthly preparation of a re-forecast, annual preparation of a budget, assistance in the preparation of quarterly tax projections, assistance with the annual tax return preparation and all treasury process and administration. The Corporate Controller will also be part of a team that creates and implements policies and procedures to identify, resolve and document accounting issues in addition to creating procedures to make the close and reporting processes more efficient and accurate. Essential Functions: prepare annual budget; prepare work papers supporting the annual tax return; coordinate the preparation of audit working papers for the external accounting firm; manage the process to record transactions by department and compare costs incurred to budget and performance analysis of profit centers; review recording of journal entries required to reflect the monthly activity; prepare working papers supporting the monthly close process and month end balances; review monthly accounting close process including analytical review of the monthly operating results to ensure accurate accounting records are maintained. Contact MTCorpController@gmail.com.

SAM HOUSTON STATE UNIVERSITY, College of Business Administration, is seeking candidates for a tenure-track Assistant Professor position in the Department of Accounting beginning Fall, 2012 (pending budgetary approval). Candidates must have a Ph.D. or D.B.A. (or ABD near completion) in Accounting from an AACSB-accredited university, be academically qualified under AACSB standards, be highly committed to quality teaching, and exhibit strong potential for successful research and publication. Professional certification is preferred. Sam Houston State University has approximately 17,000 students and is located in picturesque Huntsville, Texas, approximately 70 miles north of downtown Houston, with easy interstate highway access to Houston and Bush Intercontinental Airport. The College is AACSB-accredited and has approximately 3,300 majors including over 550 accounting majors. The Department of Accounting has over a dozen tenured/tenure-track faculty. Additional information regarding the College of Business Administration and the Department of Accounting can be found at http://www.shsu.edu/~coba/or at http://www.shsu.edu/accounting Interested candidates may contact accounting@shsu.edu. Sam Houston State University is a member of the Texas State University System and is an EEO/AAP employer.

BOWLING GREEN STATE UNIVERSITY, Department of Accounting and MIS, is seeking applicants for two positions in Accounting at the Assistant or Associate Professor level beginning Fall 2012. Demonstrated commitment to teaching excellence, research, and service is expected with an established record required for associate appointment. Applicants should send résumé, three recommendation letters, and transcript from your doctoral program to: David M. Stott, Chair, Department of Accounting and MIS, Bowling Green, OH 43403–0262. The committee will not accept electronic or fax submissions of application and materials. A complete version of this ad can be reviewed at www.cba.bgsu.edu/amis. The availability of these positions is subject to final budget approval. BGSU is an Equal Employment Opportunity/Affirmative Action employer and encourages applications from women, minorities, veterans, and individuals with disabilities.

BRYANT UNIVERSITY, Department of Accounting, invites applications for a full-time, tenure-track position beginning August 1, 2012. We welcome candidates with an interest in some combination of the following areas: Taxation (including teaching in the Master of Taxation program), Governmental/Not-for-profit Accounting, Financial Accounting, and/or Financial Accounting (Advanced Accounting). Candidates must: (1) have an appropriate terminal qualification from a program accredited by AACSB International or equivalent, or (2) be ABD (with expected completion by September 2012). Candidates must have a commitment to effective teaching and a demonstrated ability to perform quality research. The selected candidate will be expected to be an active member of the department and academic community. Certain requirements are subject to possible modification to reasonably accommodate individuals with disabilities. Bryant University is a private university accredited through the New England Association of Schools and Colleges and is ranked in the top 20 Master's University (North) by U.S. News and World Reports "America's Best Colleges." In addition, our College of Business holds accreditation from AACSB International and our Graduate School has recently been featured as one of the best 301 Business Schools by the Princeton Review. Bryant offers both undergraduate and master's degree programs in accounting. Apply to the position by visiting https://employment.bryant.edu

GEORGIA SOUTHERN UNIVERSITY invites nominations and applications for Assistant/Associate Professor of Accounting, a tenure-track position. Georgia Southern University is an institution of the University System of Georgia, accredited by SACS, and the School of Accountancy, accredited by AACSB International. Screening continues until the position is filled. The position starting date is August 1, 2012. Finalists are required to submit to a background investigation. For a full description of the position's requirements and expectations please visit http://coba.georgiasouthern.edu/coba/facultypositions.htm Georgia is an Open Records state. Georgia Southern University is an AA/EO institution. Individuals who need reasonable accommodations under the ADA to participate in the search process should contact the Associate Provost. More information is available at http://www.georgiasouthern.edu http://coba.georgiasouthern.edu/coba and http://coba.georgiasouthern.edu/depts/acc

GEORGIA SOUTHERN UNIVERSITY invites nominations and applications for the position, Director, School of Accountancy. Georgia Southern University is an institution of the University System of Georgia, accredited by SACS, and the School of Accountancy, accredited by AACSB International. For a full description of the position's requirements and expectations, please visit http://coba.georgiasouthern.edu/coba/facultypositions.htm Screening continues until the position is filled. The position starting date is July 1, 2012. A complete application consists of a cover letter addressing the required and preferred qualifications; *curriculum vita*; and contact information for at least five professional references. Applications and nominations will be accepted only as email attachments in either MS Word or PDF format. Finalists are required to submit to a background investigation. Georgia is an Open Records state. Georgia Southern University is an AA/EO institution. Individuals who need reasonable accommodations under the ADA to participate in the search process should contact the Associate Provost. More information

is available at http://www.georgiasouthern.edu http://coba.georgiasouthern.edu/coba and http://coba.georgiasouthern.edu/depts/acc

UNIVERSITY OF WYOMING, Department of Accounting, invites applications for two full-time, tenure-track Assistant Professors with teaching and research interests in any area of accounting. Candidates should have an earned doctorate in accounting from an AACSB-accredited institution (or ABD nearing completion). Relevant professional experience is also highly desired (CPA preferred). A competitive salary is available for a nine-month contract plus the University of Wyoming's excellent benefits package. Qualified candidates should mail an application letter (refer to position #1674 or #0642), three recommendation letters, *curriculum vitae*, and summaries of teaching performance to: Kenton Walker, Department of Accounting, Dept. 3275, 1000 East University Avenue, Laramie, WY 82071 or via email to kbwalk@uwyo.edu. Appointments are anticipated for Fall 2012. For more about the department and its programs, visit www.uwyo.edu/accounting. The University of Wyoming is committed to diversity and endorses the principles of affirmative action. The University of Wyoming conducts background investigations on prospective employees.

QUEEN'S SCHOOL OF BUSINESS, invites applications for two tenure-stream positions (subject to budgetary approval) in Accounting—one entry level and one senior level, starting July 1, 2012. Candidates must have or be near completion of a Ph.D. and exhibit high potential for innovative scholarly research and outstanding teaching. Queen's School of Business accounting scholars publish consistently in top journals and seek to influence public policy in Canada and internationally. For more information: http://business.queensu.ca/faculty_and_research/faculty_recruitment.php Queen's School of Business is one of the world's premier business schools, with a long, rich tradition of academic excellence (see: business.queensu.ca). This is an international search, open to candidates of all nationalities, guided by the equity and diversity principles of Queen's University: www.queensu.ca/equity Faculty at Queen's University is governed by a Collective Agreement (see: qufa.ca). Submit cover letter, *curriculum vitae*, three recommendation letters, teaching evaluations and samples of research to: accountingrecruiting@business.queensu.ca.

OHIO UNIVERSITY, School of Accountancy, invites applications for one, and possibly two, tenure-track appointment(s) as Assistant/Associate Professor beginning in August 2012. We are looking for a student-friendly, research-active, innovative faculty member and will consider applicants with teaching and research interests in any area of accounting. All applicants must be academically qualified under AACSB standards, be able to show evidence of the ability to produce quality research and to achieve a record of teaching excellence, and be committed to professional interaction. Ohio University takes pride in its vibrant residential campus that attracts top quality students. Athens, Ohio, is a quintessential college town and is a family-friendly and culturally rich community located southeast of Columbus, Ohio. Review of applications continues until the position is filled. Contact: Dr. Connie Esmond-Kiger with questions at kiger@ohio.edu. More information about Ohio University is available at http://www.ohiou.edu and highlights of the College of Business experience at http://www.cob.ohiou.edu The position is listed at www.ohiouniversityjobs.com/hr Diversity is a core value of the College of Business at Ohio University. We believe that the educational environment is enhanced when diverse groups of people with diverse ideas come together to learn. Ohio University is an Affirmative Action/Equal Opportunity Employer. Women, minorities, veterans, and individuals with disabilities are encouraged to apply.

GONZAGA UNIVERSITY invites applications for two tenure-track Assistant Professor appointments beginning Fall 2012. One position requires a teaching interest in tax, particularly at the graduate level. The

other requires a teaching interest in audit, with interest in teaching financial also. Candidates must have a commitment to excellence in teaching and scholarship. Qualifications required: Earned doctorate, or expectation to complete doctorate, by August 2012. Candidates with JD will also be considered for tax position. Preference will be given to candidates with professional certifications and experience. Gonzaga University is a private, liberal arts institution of approximately 7,800 students (4,900 undergraduates). The School of Business Administration is AACSB-accredited, as are the undergraduate and graduate accounting programs. As a Jesuit, Catholic, humanistic institution, Gonzaga is interested in candidates who will contribute to its distinctive mission. Gonzaga University is an AA/EEO employer committed to diversity. Qualified candidates should apply online at www.gonzaga.edu/employment Please submit a letter of application, *curriculum vitae*, and the names, addresses, and telephone numbers of three references. For information regarding the positions, email Dr. Gary Weber at weber@gonzaga.edu.

UNIVERSITY OF IOWA, The Department of Accounting, Tippie College of Business, invites applicants for a tenure-track appointment(s) beginning Fall 2012. We will consider candidates at all ranks. Required qualifications include a demonstrated interest in and capacity to do research publishable in top-tier accounting journals, a high level of teaching competence, and an earned doctorate (entry-level candidates can be near completion). Applicants must have a Ph.D. degree (or be a candidate for a Ph.D. degree) in academic Accounting or related discipline. Assistant-level candidates should have a completed or nearly completed dissertation and clearly exhibit high potential for scholarly research and effective teaching. Candidates with an established record of excellence in published scholarly research and quality teaching will be considered for positions at the rank of associate of full professor. We offer a competitive compensation package. We will screen applicants at all ranks on an ongoing basis. To apply, please log on to our website, http://jobs.uiowa.edu/jobSearch/faculty/, and reference Requisition #59668. You will be asked to upload a résumé, representative research output, evidence of teaching capabilities (if available), and to provide the names for at least three letters of recommendation. The University of Iowa is an Affirmative Action, Equal Opportunity Employer. Women, minorities and individuals with disabilities are encouraged to apply.

PACE UNIVERSITY, Lubin School of Business, invites applications for a tenure-track position in financial accounting, at the assistant or associate level, starting Fall 2012. A successful candidate for this position must reflect the School's commitment to excellence in teaching and scholarly research. A Ph.D. is required and practical experience is beneficial. The Lubin School of Business of Pace University is a recognized leader in business education and is committed to preparing professionals for successful careers in the global economy. The School offers an extensive array of undergraduate, graduate, and post-graduate programs on campuses in New York City and Westchester County. The Accounting Department is fully accredited by the AACSB-the International Association for Management Education. Salary and benefit package is competitive. Please email your résumé to Dr. Rudy Jacob rjacob@pace.edu. Pace University is an Affirmative Action/Equal Opportunity Employer.

UNIVERSITY OF UTAH, School Of Accounting, invites applications for a new tenure-track faculty position in Accounting at the Assistant or Associate rank in any area beginning Fall 2012, pending funding and University approval. Applicants should possess a doctorate by Fall 2012. The School of Accounting and the David Eccles School of Business are accredited by the AACSB. Application due by November 30, 2011 or until position is filled. Please include working paper, *vita*, evidence of teaching effectiveness, and three letters of reference to Martha Eining, Director, School of Accounting, 1645 E. Campus Center Dr., Room 108, University of Utah, Salt Lake City, Utah 84112. The University of Utah, an Equal Opportunity, Affirmative Action employer, encourages applications from women and minorities, and provides reasonable accommodation to the known disabilities of applicants/employees. The University of Utah values candidates who have experience working in settings with students from diverse backgrounds, and possess a strong commitment to improving access to higher education for historically underrepresented students.

BRADLEY UNIVERSITY, Foster College of Business, invites applications and nominations for a tenure-track faculty position in accounting. A Ph.D. or D.B.A. or near completion with emphasis in accounting is required. Professional certification (CPA, CMA, or CIA) is desirable. Primary teaching needs are in Financial Accounting and/or Auditing, but candidates must be able to teach in another area. Demonstrated excellence in teaching and scholarly research is required for Tenure and Promotion. Salary is AACSB competitive. Position is available Fall 2012 with teaching opportunities available at both the undergraduate and graduate levels. Bradley University is a distinctive, medium-size, comprehensive, private institution of higher learning. The University is located on a 75-acre campus in Peoria, the largest metropolitan area in central Illinois. With 5,000 undergraduate and 1,000 graduate students, Bradley offers the opportunities and choices of a larger university (with over 90 programs in five colleges, plus a graduate school) and the quality, personal attention, and challenge of a small private college. Bradley is rich in tradition and full of promise to become one of the nation's best comprehensive universities. Interested applicants should submit a letter of application, current *vita*, transcripts, and contact information for three professional references to: Dr. John Gillett, Chair, Department of Accounting, Bradley University, Peoria, IL 61625. (309) 677–2290. Screening of applications will begin immediately and continue until the position is filled. For additional information, please visit www.bradley.edu Bradley University is an Equal Opportunity and Affirmative Action Employer. The administration, faculty, and staff are committed to attracting qualified candidates from groups currently underrepresented on our campus.

UNIVERSITY OF SOUTH CAROLINA UPSTATE is seeking a tenure-track, nine-month Assistant Professor or Associate Professor of Accounting to teach accounting on the Spartanburg and/or Greenville campuses beginning August 16, 2012. Required: Ph.D. in Accounting or a closely related field from an AACSB-accredited institution. ABDs will be considered for tenure-track position upon verification of terminal degree. All applicants must be academically qualified under AACSB standards and must demonstrate a commitment to teaching excellence and to publishing in peer reviewed journals. Applicants must also demonstrate ability and commitment to contribute to the College's mission through service. Candidate should embrace diversity and be comfortable with community engagement and service that might include student advising and undergraduate research. Preferred: Professional certification in accounting, professional experience, and ability to work closely with students and the professional community. Review of applications begins immediately and continues until positions are filled. USC Upstate is located in Spartanburg, SC. Spartanburg, as well as nearby Greenville are part of the International Business hub of Upstate South Carolina. The Upstate, a region with over one million people, is a thriving family friendly community with many excellent public and private schools. Official transcripts will be required before hire date as well as a background check. Click here to apply now http://www.uscupstate.edu/about_upstate/employment/jobs/default.aspx?id=8142

UNIVERSITY OF ILLINOIS at Urbana–Champaign, The Department of Accountancy, is recruiting faculty for full-time appointments at all ranks. Candidates at advanced ranks must possess a doctoral degree, and candidates for Assistant Professor positions must possess or be near completion of a doctoral degree. Applicants for senior positions should have a strong research record and the ability to participate in doctoral education and curriculum development at the undergraduate and graduate levels. In addition, non-tenure track lecturer and visiting positions are available. Applicants should submit a résumé that lists research publications and courses taught. Compensation is competitive and will be commensurate with the appointment level and applicant's record. For full consideration, please create your candidate profile at http://jobs.illinois.edu and upload the required documents, including cover letter, *curriculum vitae*, teaching statement, research statement, course evaluations and the names and email addresses or phone numbers of three professional references by January 20, 2012. In your cover letter please state which rank you are applying for. Proposed starting date is June 16, 2012 or August 16, 2012. For further information please refer to http://www.business.illinois.edu/accountancy/recruit.html or email accyrecruiting@business.illinois.edu. Contact: Recruiting Chair, Department of Accountancy, 360 Wohlers Hall, College of Business, University of Illinois, 1206 S. Sixth Street, Champaign, IL 61820. Illinois is an Affirmative Action/Equal Opportunity Employer and welcomes individuals with diverse backgrounds, experience, and ideas who embrace and value diversity and inclusivity. (www.inclusiveillinois.edu).

DUQUESNE UNIVERSITY invites applications for two tenure-track positions at the Assistant or Associate Professor level beginning Fall 2012. Applicants at the Assistant rank should have completed/nearly completed their Ph.D. The ideal candidate is committed to teaching excellence and possesses an active research program. All teaching areas will be considered. Duquesne is a private, AACSB-accredited university ranked among the top ten Catholic Universities in the United States by *U.S. News and World Report*. Duquesne University was also ranked No. eighteen worldwide by the Aspen Institute for leadership in integrating social and environmental issues into its Master of Business Administration (M.B.A.) program. Duquesne's campus spans a 50-acre hilltop and is a five-minute walk from downtown Pittsburgh. Submit a letter of application and *curriculum vitae* to: Stephen Rau at rau@duq.edu. Applications will be accepted until October 1, 2011. Duquesne University is an Equal Opportunity/Affirmative Action Employer. Position is pending administrative approval.

UNIVERSITY OF BALTIMORE, Robert G. Merrick School of Business, invites applications for the position of Professor or Associate Professor and Chair, Department of Accounting. The position is available beginning Fall 2012 and is subject to final budget approval. Appointments may be made carrying immediate tenure provided the candidate has appropriate credentials and after meeting a formal review. Candidates should hold a doctoral degree in accounting from an AACSB International accredited university. The candidate must also have a proven research record. Individuals with research and teaching interests in the area of auditing and a CPA certification are preferred. Preference will also be given to candidates with first-hand experience in managing personnel and budgets, strong communications skills and the ability to interact effectively with the professional accounting community and business partners. Experience with accounting curricula, assessment of learning outcomes and AACSB accreditation are also essential. Salary is competitive and commensurate with experience. Applicants should submit a letter of interest including a *curriculum vita*, recent teaching evaluations, and contact information for three professional references. Applicants receiving further consideration will be asked to submit manuscripts of recent work. Applications and questions about the position or the University may be directed to: Professor Phillip Korb, Department of Accounting: pkorb@ubalt.edu.

BALL STATE UNIVERSITY seeks candidates for a tenure-track position available August 17, 2012. Responsibilities include: teaching accounting courses at the undergraduate and graduate levels. Primary interest is in financial accounting but other accounting areas will be considered. Minimum qualifications: ABD toward doctorate in accounting or other closely related business field, completion of degree by November 1, 2013; evidence of scholarly research; teaching experience in accounting or other closely related business field at the university level. Preferred qualifications: Ph.D. or D.B.A. in accounting; full-time teaching experience at the university level; significant record of publications in refereed journals in the accounting area and/or evidence of other scholarly contributions; and CPA or CMA certificate. Competitive salary and benefits package. Send letter of application, *curriculum vitae*, official transcripts, and the names of three (3) references to: Dr. Lucinda L. Van Alst, Chair, Department of Accounting, Ball State University, WB 303, Muncie, IN 47306. Review of applications will begin immediately and will continue until the position is filled. Ball State University (www.bsu.edu) is an equal opportunity, affirmative action employer and is strongly and actively committed to diversity within its community.

CLARK UNIVERSITY, Graduate School of Management (GSOM), AACSB-accredited since 1986, invites applications for a tenure-track Assistant Professor to begin Fall 2012. The appointment requires a doctorate in accounting from an AACSB-International accredited institution; additional professional qualifications will be a plus. Teaching responsibilities include advanced-level financial accounting and auditing courses. GSOM offers B.A., M.B.A. (full-time and part-time), and M.S.F. degrees. A Masters of Science degree program in accounting is expected to be operational in Fall 2012. Evidence or promise of excellence in teaching and research will be required. GSOM offers a highly supportive interdisciplinary research environment. Clark University is located in the heart of New England in Worcester, Massachusetts. In addition to offering programs on the main campus in Worcester, GSOM has a satellite campus in Metrowest-Boston. The compensation and benefits package is highly competitive. Please send application letter, *vita*, three references, and a statement of teaching philosophy and research agenda electronically to: GSOMAccountingSearch@clarku.edu. Review of applications will begin immediately and will continue until the position is filled. For additional information about GSOM please visit: http://www.clarku.edu/gsom/current/academics/index.cfm Clark University is an affirmative action and equal opportunity employer. Minorities and women are strongly encouraged to apply.

UNIVERSITY OF ARKANSAS AT LITTLE ROCK invites applications for Chair of the Department of Accounting, a tenured 12-month appointment, effective July 1, 2012. Applicants must possess a Ph.D./D.B.A. with a concentration in accounting from an AACSB-accredited university; at least ten (10) years of effective accounting teaching experience at the undergraduate and graduate levels at an AACSB institution; a record of intellectual contributions and institutional service to support appointment as a tenured Professor of Accounting; evidence of commitment to students' success; the CPA or other professional certifications; demonstrated leadership capabilities; and a record of successful interaction with the professional community. For application information, reference R98170 and contact Ms. Patrice Sims, Dean's Office, College of Business, University of Arkansas at Little Rock, 2801 South University Avenue, Little Rock, Arkansas 72204 or email to: pnsims@ualr.edu. UALR is an AA/EO employer. Applicants are subject to background/credit check and persons hired must have proof of legal authority to work in the United States.

DEMAND MEDIA STUDIOS is hiring writers for eHow Money, a top personal finance site, which helps millions of people take the mystery out of finance and business decisions through credible and informative online articles. We are looking for well qualified writers, bloggers, and business/finance professionals to contribute to this site. As a Demand Media Studios Finance writer, you will be able to write on a variety of topics including personal finance management, home financing, entrepreneurial ventures, investment strategies and others. Articles are short-form, informational and average 300–400 words in length. Click here to learn more. Qualifications: We are looking for one or more of the following from our applicants: business, finance or management degree; demonstrated experience in any business, finance or law fields; experience writing on business and finance topics; college degree in journalism, English or communications. Benefits: Choose your topics from thousands of available assignments; receive editorial guidance and feedback twice-a-week; payments for all published articles, typical assignments pay $25 per article; you can expect to earn $20–$25 per hour. Read a published article, apply now: The eHow Money team is a well-qualified group of business and writing professionals. To ensure our visitors are presented with the best advice possible, we screen all applicants for past work experience and their writing ability. If you are interested in being published on eHow Money, please have your résumé and a non-fiction writing sample ready and fill out an online application. Learn more and apply at: http://www.demandstudios.com/freelance-writing-jobs-business-finance.html?utm_source=BIZaaahq&utm_medium=jobpost&utm_campaign=moneyLP

UNIVERSITY OF CALGARY, Haskayne School of Business, invites applications for a tenure-track position at the Assistant/Associate Professor level. The successful candidate may teach undergraduate and graduate courses in financial accounting, managerial accounting, auditing, or taxation. The applicant should have a Ph.D., will be expected to take an active role in research, and must provide evidence of effective teaching at the university level. Anticipated starting date is July 1, 2012. All applications received before January 1, 2012 will be given full consideration. The position will remain open until filled. All qualified candidates are encouraged to apply; however, Canadians and Permanent Residents will be given priority. Interested individuals should submit their *curriculum vitae*, along with the names of three references and examples of teaching evaluations to: Dr. Philip Beaulieu, Chair, Recruiting Committee, Haskayne School of Business, University of Calgary, 2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4. Email: philip.beaulieu@haskayne.ucalgary.ca

BAYLOR UNIVERSITY, Department of Accounting and Business Law, a Baptist university affiliated with the Baptist General Convention of Texas, invites applications for two anticipated tenure-track positions (contingent on budget approval) for Fall 2012. Applicants at all academic ranks and in all teaching and research areas will be considered, although our primary needs are in accounting information systems, financial accounting, or tax. A Ph.D. in accounting is required, although ABD candidates will be considered at the Assistant level. Candidates should demonstrate excellent teaching potential and an ability to establish and maintain an ongoing program of substantive research. Professional certification is preferred. Applicants must demonstrate research and teaching excellence. Applications, including *curriculum vitae*, three letters of reference, working paper or defended dissertation proposal, and evidence of an active Christian faith commitment should be sent to: Dr. Charles E. Davis, Department of Accounting and Business Law, Baylor University, One Bear Place #98002, Waco, TX 76798–8002; email: Charles_Davis@baylor.edu. Applications will be reviewed beginning November 1, 2011 and will be accepted until the position is filled. As an Affirmative Action/Equal Employment Opportunity Employer, Baylor University encourages minorities, women, veterans, and persons with disabilities to apply.

TENNESSEE TECHNOLOGICAL UNIVERSITY, Department of Accounting, is accepting applications for an Assistant/Associate Professor, full-time, nine-month, tenure-track appointment to begin August 1, 2012. Qualifications: A doctoral degree in Accounting, or ABD nearing completion, from an AACSB doctoral-granting institution. CPA professional certification preferred. The candidate must have excellent communication skills, an interest in publishing in peer-reviewed journals, and a willingness to teach both on-campus and online accounting courses. Primary teaching need is Cost/Managerial Accounting. However, candidates who are able to teach in other accounting areas are encouraged to apply. Rank and Salary: Commensurate with education and experience. Essential Functions: Instruction in the undergraduate accounting program and graduate M.B.A. and distance M.B.A. programs at TTU; development of an ongoing research program resulting in publication in peer-reviewed journals; involvement in professional and university service activities. Contact: Dr. Richard Rand at richardrand@tntech.edu. Apply to position by visiting http://www.tntech.edu/jobs

STANFORD UNIVERSITY, Graduate School of Business, faculty, invites applications for tenured and non-tenured faculty positions in Accounting, effective September 1, 2012, from candidates at all levels and stages of their careers who are interested in financial accounting, managerial accounting, tax and other areas. Candidates should have or expect to complete a Ph.D. by September 1, 2012, as well as the highest level of accomplishment or promise in both scholarly research and M.B.A. and Ph.D. teaching. Applications should include *curriculum vitae* and copies of research publications. Applicants are strongly encouraged to submit their applications electronically by visiting the web site http://www.gsb.stanford.edu/recruiting and uploading their *curriculum vitae*, research papers and publications, and teaching evaluations, if applicable, on that site. Alternatively, all materials may be sent by email to:

faculty_recruiter@gsb.stanford.edu or by postal mail (non-returnable) to Office of Faculty Recruiting, Box A, Graduate School of Business, Stanford University, 655 Knight Way, Stanford, CA 94305–7298. However, submissions via email and postal mail can take 4–6 weeks for processing. For an application to be considered complete, all applicants must have three letters of recommendation emailed to the preceding email address, or sent via postal mail. The application deadline is December 1, 2011. Stanford University is an equal opportunity employer and is committed to increasing the diversity of its faculty. It welcomes nominations of and applications from women and members of minority groups, as well as others who would bring additional dimensions of diversity to the University's research, teaching and clinical missions.

COLLEGE OF CHARLESTON invites applications for an accounting professor tenure-track position at the Assistant Professor level beginning spring or Fall 2012. Candidates should expect to have a Ph.D. degree from an AACSB-accredited university by the time employment begins. Applicants with all research and teaching interests will be considered. The faculty member will be expected to publish in peer-reviewed journals as well as participate in service to the department, school, college, and professional community. Teaching experience, business experience, and professional certification are desirable. Information about our program can be found at http://www.cofc.edu Applicants should send a cover letter, *vitae*, and names of three references to: Dr. Roger Daniels via email to danielsr@cofc.edu. The College of Charleston is an Equal Opportunity/Affirmative Action Employer and encourages applications from women and minorities.

WASHINGTON STATE UNIVERSITY, TRI-CITIES, and the College of Business, invite applications for tenure-track faculty position(s) in Accounting at the Assistant or Associate Professor level to begin Fall Semester 2012. Candidates must possess (1) an appropriate doctorate accounting from a nationally recognized program, (2) a demonstrated record of published research or research potential, and (3) strong evidence of teaching effectiveness. Preference will be given to candidates with (1) teaching interests in financial accounting plus a supporting area in audit, systems, or tax and (2) relevant ability working with diverse populations. Compensation is competitive and commensurate with qualifications and experience. Applicants should submit a letter of application addressing the minimum and preferred qualifications, a current *vita*, and contact information for three references to: Search Chair, Washington State University Tri-Cities at accounting@tricity.wsu.edu. Screening of application materials will begin on September 19, 2011. The responsibilities of this position include: (1) academic research, (2) teaching, and (3) service. Faculty members must remain academically qualified (per AACSB standards for WSU) by performing academic research and publishing in target journals. The normal teaching load is two courses per semester. Faculty members are also expected to make significant contributions to their department, college, university, community, and profession. EEO/AA/ADA

UNIVERSITY OF NEW MEXICO, Anderson School of Management, seeks applicants for a position, subject to availability of funding. The appointment may be at the rank of Assistant or Associate Professor in a probationary status leading to a tenure decision or may be a tenured position depending on qualifications. Applicants must possess a Ph.D. or D.B.A. in accounting or related field, or be ABD at time of application with expected degree completion by August 2012. Accounting Information Systems and Financial Accounting preferred but all areas will be considered. Applicants must be prepared to teach at the graduate/undergraduate levels. For best consideration, submit completed applications by October 1, 2011, however, applications will be accepted until the position is filled. Apply to the position by visiting http://www.unm.edu/jobs/ The University of New Mexico is an Equal Opportunity/Affirmative Action Employer and Educator.

UNIVERSITY OF KANSAS, School of Business, seeks applicants for three accounting tenure-track or tenured positions, beginning August 2012. These positions are contingent on availability of funding. Assistant/Associate/Full Professors are responsible for teaching, research, and service, at approximately a 40/20/20 time split. Teaching responsibilities are four sections each academic year. Reduced/consolidated teaching opportunities are a possibility for new Assistant Professors. One position, at the assistant or associate level, will be responsible for teaching and researching in the financial accounting area. Associate Professors or experienced Assistant Professors are preferred. Such applicants should have a demonstrated interest and ability in mentoring doctoral students. Two positions are for candidates with the ability to teach and preferably research in the tax area. One position is at the assistant level. The other position is at the Assistant, Associate, or Full level. Research endeavors for all positions should be focused on publication in the most highly regarded journals. Candidates for a tenured position should have a record of achievement in teaching and research to warrant such an appointment, evidence of an on-going, high quality research program and the experience, interest and ability to work with doctoral students. Candidates for a tenure-track position should have evidence of high quality research and teaching accomplishment and/or potential. A Ph.D. in accounting must be completed by the appointment date. Preferred qualifications for tax applicants include research interests involving the role of tax systems in economic development, sustainable resources, and encouragement of entrepreneurial activity. Preferred qualifications for financial accounting applicants include research interests involving the role of financial information in economic development and encouragement of entrepreneurial activity. Preferred qualifications for both tax and financial accounting positions include publications in top academic journals. About us: Rank and salary are competitive and commensurate with qualifications. Summer funding, graduate assistants, and travel support are available. An endowed fellowship is a possibility for the senior tax position. The Accounting program offers degrees at the bachelors, masters, and doctoral levels. It is separately accredited by the AACSB. For additional information about the School and its faculty and programs, see: http://www.business.ku.edu/ Application information: For questions, expressions of interest or to obtain application information, contact: (1) for financial accounting: Mike Ettredge, mettredge@ku.edu; (2) for tax accounting: Allen Ford, aford@ku.edu; School of Business, University of Kansas, 1300 Sunnyside Ave., Lawrence, KS 66045–7601. Applications will require a letter of interest and qualifications, a *curriculum vita*, example(s) of scholarly work, and the names and contact information for at least three references. To apply please go to https://jobs.ku.edu and search for position number #00003541 for financial and #00001360 for tax. Initial reviews will begin September 1 for both tax positions, and will continue until the positions are filled. Initial reviews will begin September 1 for experienced assistant and Associate Professors applying for the financial position. Initial reviews will begin November 1 for ABD students applying for the financial position. Reviews for the financial position will continue until the position is filled. The University of Kansas is an Equal Opportunity/Affirmative Action Employer. The University encourages applications from underrepresented group members. Federal and state statutes prohibits discrimination on the basis of race, religion, color, national origin, ancestry, sex, age, disability, and veteran status. In addition, University policies prohibit discrimination on the basis of sexual orientation, marital status, parental status, gender identity, and gender expression.

JOHN CARROLL UNIVERSITY, The Department of Accountancy, invites applications for a tenure-track position beginning in the Fall, 2012 term at the Assistant Professor level. A doctorate in accounting from an AACSB-accredited institution (or ABD) is required; professional certification and a specialty in Tax, AIS, Audit or Cost is preferred. Our mission requires us to consider only candidates who will become both productive scholarly researchers and excellent classroom teachers. Candidates should send a letter of application with their *curriculum vita* indicating three references to: Dr. Gerald Weinstein, Boler School of Business, 20700 North Park Boulevard, University Heights, OH 44118. Contact information: 216–397-4609, weinstein@jcu.edu. Applications will be accepted until the positions are filled. We are an Affirmative Action, Equal Opportunity Employer, committed to diversity in the workplace, and strongly encourage applications from women and minorities.

UNIVERSITY OF MISSOURI–ST. LOUIS, College of Business, invites applications for the position of Assistant or Associate Professor of Accounting, beginning August, 2012. Applicants must possess a doctorate or be near completion and have a strong commitment to excellence in both teaching and research. We welcome candidates with research and teaching interests in any area of accounting, with particular preference for candidates with teaching interest in Cost/Managerial accounting. Research requirements are realistic. The teaching load is moderate. Salary and benefits are competitive. The University of Missouri-St. Louis is one of the four campuses of the University of Missouri system. It is located just outside the city, on a light rail line, near the airport and close to both many attractive residential areas with excellent school districts and offering easy access to St. Louis' top cultural and entertainment attractions. The cost of living in St. Louis is very affordable. Find out about living in St. Louis at www.stlrcga.org/x348.xml The College of Business offers undergraduate and master's degree programs including a Bachelor of Science in Accounting, a Master of Accounting, and an M.B.A. The College is AACSB-accredited in both Business and Accounting. The Accounting Department has eleven collegial, full-time faculty members with varied research interests. Apply to the position by contacting Greg Geisler, Associate Professor of Accounting at geisler@umsl.edu.

NORTHERN KENTUCKY UNIVERSITY, Department of Accounting, Finance, and Business Law of Haile/Bank College of Business, invites applications for a tenure-track position at the Assistant Professor level beginning in August 2012, with primary teaching responsibility in the area of auditing. Requirements include a Ph.D. in accounting, commitment to teaching excellence, and demonstrated ability to do quality academic research. Teaching at the undergraduate and graduate level, quality academic scholarship, service to the university, and profession. Professional certification and professional accounting experience preferred. NKU is located in the beautiful rolling hills of northern Kentucky just five miles from downtown Cincinnati. The College of Business is AACSB-accredited and offers both undergraduate and graduate degrees including a Masters of Accountancy. Additional information is available at www.nku.edu/~cob. Qualified candidates should submit a letter of application, current résumé, and contact information for three references, electronically to: Dr. Bob Russ, Search Committee Chair, at russr1@nku.edu. Northern Kentucky University is an Affirmative Action/Equal Opportunity Employer.

LOUISIANA TECH UNIVERSITY, School of Accountancy, seeks applications for assistant or Associate Professor for a Fall 2012 anticipated appointment. Accounting doctorate is essential, and there is a strong preference for candidates with accounting certification. An established publication record of discipline-based scholarship in high quality journals is preferred. Position requires teaching at the upper division and graduate levels, publishing discipline-based research, and involvement with the accounting doctoral program. Responsibilities could also include teaching an occasional online class. Applicant review will continue until position is filled. Salary will be competitive. Located 65 miles east of Shreveport and 30 miles west of Monroe, enrollment is around 11,000 students. Please send applications or letters of inquiry to: Thomas J. Phillips, Jr., Director, School of Accountancy, P.O. Box 10318, Louisiana Tech University, Ruston, LA 71272. (318) 257–2822, Fax (318) 257–4253, phillips@latech.edu http://www.business.latech.edu (EEO/AA/ADA) Women and minorities encouraged to apply. Member of the University of Louisiana System.

CLEVELAND STATE UNIVERSITY, College of Business, is accepting applications for Assistant/Associate Professor of Accounting tenure-track, to develop and teach accounting courses. Teaching needs exist in all areas, but particularly in auditing and financial accounting. Responsibilities include: advising students, engaging in scholarly activities and publications, and providing service to the department, college, and university. Teaching is at on-campus and/or off-campus locations at the graduate and undergraduate levels. Minimum Qualifications: Doctorate in Accounting from an AACSB-accredited institution. ABD's considered if degree will be completed by June 30, 2013. We may consider candidates with a doctorate in a business field who have a strong accounting background, including current CPA certification and Academically Qualified status for AACSB purposes. Preferred Qualifications: Proven effectiveness in teaching accounting; professional accounting certification such as the CPA, CFE, etc.; the ability to teach auditing and/or financial accounting; evidence of ability to make intellectual contributions to accounting; effective oral and written communication skills. Position to start August, 2012. CSU is an AACSB school and will pay a very competitive AACSB wage, with excellent benefits and strong support provided to our faculty for teaching and research. Reply to: Professor Pete Poznanski, BU 512, College of Business, Cleveland State University, 1860 E. 18th Street, Cleveland, Ohio 44115 or email to p.poznanski@csuohio.edu

CALIFORNIA STATE UNIVERSITY EAST BAY invites applications for Assistant Professor position in taxation to begin Fall 2012. Responsibilities include teaching taxation courses in an online M.S. Tax program, undergraduate accounting, or business law classes; conducting academic research in the area of taxation/accounting; and providing service to the University. A candidate should have an earned Ph.D. in accounting from an AACSB-accredited institution, or M.S. Tax or L.L.M. no later than the effective date of appointment. The candidate should be academically qualified, have specialized course work or academic preparation in the area of taxation, demonstrate a record of teaching excellence and peer-reviewed scholarship, and have strong communication skills. Professional certifications and extensive work in the tax profession are desirable. Review of applications will begin September 15, 2011 and will continue until the position is filled. Please send a letter of application, a complete and current *vita*, graduate transcripts, copies of major publications, and three letters of recommendation to: Dr. Micah Frankel, Chair, Department of Accounting and Finance, California State University, East Bay, 25800 Carlos Bee Boulevard, Hayward, CA 94542. Telephone (510) 885–3397 Email: accounting.recruitment@csueastbay.edu. Visit the web site: http://www.csueastbay.edu

MARQUETTE UNIVERSITY invites applications for one tenure-track position in Accounting Information Systems beginning Fall 2012. Applicants should hold a doctoral degree or be in the final stages of dissertation. The position will be filled at the rank of Assistant Professor. The primary teaching responsibility will be in Accounting Information Systems at the undergraduate and graduate levels with a secondary area from one of the following: Managerial, Fraud, Audit, Financial, or International. The normal teaching load is 12 semester hours (6 hours each semester) during the first year and 15 semester hours thereafter. Salary and research support are competitive. The department has 11 full-time faculty members. Marquette offers AACSB-accredited undergraduate and graduate degrees in Accounting and Business. All applicants must apply on line using the following link: https://careers.marquette.edu/applicants/Central?quickFind=53191 Inquiries may be made to: Michael D. Akers, Professor and Chair, Department of Accounting, PO Box 1881, College of Business Administration, Marquette University, Milwaukee, WI 53201–1881. Email: Michael.Akers@marquette.edu. Marquette University is an Affirmative Action/Equal Opportunity Employer.

AUGUSTA STATE UNIVERSITY, Knox School of Accountancy in the Hull College of Business, invites applicants to join a dedicated team of accounting faculty for a tenure track position to begin Fall 2012. The school is currently recruiting candidates for two tenure-track faculty positions in accounting with teaching interests in Accounting Information Systems, Cost/Managerial, and Financial Accounting Theory I. The Hull College of Business offers AACSB-accredited B.B.A. and M.B.A. degree programs. About 850 undergraduate and 120 graduate students are served by the College's 27 faculty and 7 staff members. More information about the College may be found at http://www.hull.aug.edu. Applicants should submit: a letter of application (including teaching preferences); current *curriculum vitae*; and names and contact information for five academic and/or professional references to: Pamela Jackson, Knox School of Accountancy, Hull College, Augusta State University, 2500 Walton Way, Augusta, GA, 30904–2200; or email to pjackson@aug.edu. Applications will be accepted until September 26, 2011. Applicants must be work eligible. The Hull College of Business is accredited by AACSB-International and Augusta State University is an Affirmative Action/Equal Opportunity Institution.

SIENA COLLEGE Accounting Department invites applications for a tenure- track position beginning September 2012. Applications will be accepted and considered until the position is filled. Rank and salary are dependent upon experience and credentials. A Ph.D./D.B.A. with concentration in accounting is expected, relevant business experience is desirable. Research and professional development activities appropriate to academically qualified status for AACSB accreditation and the School of Business mission are necessary. If sufficient Academically Qualified individuals are not located then individuals presently Professionally Qualified and willing to pursue a Ph.D. or D.B.A. may be considered for a Visiting position. In this case continued satisfactory progress towards a Ph.D. or D.B.A. is required for renewal. Siena College is an independent liberal arts college in the Catholic and Franciscan tradition, located in New York's Capital District, close proximity to major higher education and cultural institutions. The college enrolls 3,200 full-time students, 1,200 in the School of Business. Contact: Accounting Search Committee, c/o School of Business, Siena College, 515 Loudon Road, Loudonville, NY 12211–1462. As an Equal Opportunity Employer, Siena College surveys all job applicants in accordance with the U.S. Department of Labor's affirmative action requirements. Therefore, we request that in addition to your application, you complete the Equal Employment Opportunity Data Form located at www.siena.edu/eeo In order to complete the form, you will need the posting number for this position which is R733. Any information you choose to provide on the Equal Employment Opportunity Data Form will be treated as personal and confidential and will be kept separate from your application for employment. Your cooperation is key to maintaining an effective equal opportunity program at Siena College and is greatly appreciated.

MOREHEAD STATE UNIVERSITY, is accepting applications for a tenure-track position as Assistant Professor of Accounting beginning August 2012 in the School of Business Administration within the College of Business and Public Affairs. Doctorate degree in accounting is preferred; however, ABDs close to completion are encouraged to apply. Open to individuals with background in the traditional areas of accounting, but teaching and research interests in Auditing and Accounting Systems are preferred. Duties include teaching 3 to 4 courses (2 to 3 preparations) per semester of undergraduate and possibly graduate courses in accounting. Mix of principles and upper-level accounting courses is typical load. Scholarly activity leading to publication in peer-reviewed journals in accounting is expected. Morehead State University is recognized as one of the top public universities in the South by U.S. News & World Report. The College of Business and Public Affairs is fully accredited by AACSB International. Contact L. K. Williams at: l. williams@moreheadstate.edu. Apply to the position by visiting http://www.Click2Apply.net/jqkg6s7

INDIANA UNIVERSITY, Kelley School of Business, Indianapolis, invites applications for Accounting positions (tenure-track, clinical, lecturer; all ranks) beginning August 2012. Rank depends on qualifications. Qualified tenure-track candidates must hold a Ph.D. from an accredited institution, have excellent research and teaching skills, and demonstrate ability to produce scholarly work at the highest level; preference for teaching in auditing or tax accounting, but all specialties will be considered. Professional certification is a plus. A Ph.D.is strongly preferred for clinical and lecturer appointments, as is evidence of scholarly activity and professional certification. Indiana University's Kelley School of Business has programs in two locations: Bloomington and Indianapolis. Indianapolis programs are located on the campus of Indiana University Purdue University Indianapolis (IUPUI). IUPUI is Indiana's premier urban research university and a core campus of Indiana University. The Kelley School of Business Indianapolis http://kelley.iupui.edu has over 1,700 students and over 50 full-time faculties and offers undergraduate, M.B.A., M.S.A., and M.S.T. degrees. The school is located in a vibrant city and provides excellent opportunities for a career and high quality of life. The Kelley School consistently is ranked among the top-20 M.B.A. programs in the world. The Indianapolis Evening M.B.A. program was recently ranked in the top 10 part-time M.B.A. programs in the U.S. Qualified applicants should submit electronically a letter of application, a list of three references, and *vita*/ résumé to: Sherri Hendricks slhendri@iupui.edu and indicate if you are applying for the tenure-track or non-tenure-track position. The deadline for applications is October 1, 2011 or until the position is filled. Recruiting Committee Co-Chairs are J. Reed Smith (jrsmith2@iupui.edu) and John M. Hassell (jhassell@iupui.edu), Professors of Accounting. Indiana University is an AA/EOE Employer, Educator and Contractor, M/F/D

UNIVERSITY OF LOUISVILLE, School of Accountancy in the College of Business, invites applications for a full-time, tenure-track position at the level of Assistant Professor of Accountancy to begin August 2012. The successful candidate will have a Ph.D. (Accountancy). Candidates must exhibit the potential to publish in top quality accountancy journals. All candidates are expected to demonstrate excellence in teaching and have effective inter-personal skills. Salary and teaching loads are highly competitive. Louisville, Kentucky offers many of the attractions of a large city and has a thriving business community. Candidates must apply online at www.louisville.edu/jobs The Job Opening ID number is 27169. Along with the completed online job application you may ONLY attach your *curriculum vita*. The Search Committee will accept applications until a new Accountancy faculty member is selected. Interested individuals are encouraged to submit separately their letter of interest, names of three references, student evaluations, and examples of scholarly work by October 15, 2011 or until filled. Send information to: Dr. Julia Karcher, School of Accountancy, College of Business, University of Louisville, Louisville, KY 40292 or electronically to julia.karcher@louisville.edu. Additional information about the School of Accountancy and the College of Business can be found at http://business.louisville.edu The University of Louisville is an Equal Opportunity/Affirmative Action Employer.

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE, The Belk College of Business, invites applications for a full-time tenure track position(s) in, Assistant/Associate/Full Professor(s) of Accounting. All ranks will be considered. A Ph.D. degree from an accredited school in the field of accounting or closely related discipline is required. A strong commitment to excellence in high-quality innovative research and teaching at the undergraduate and graduate levels is expected. Candidates at the associate or professor level must have an outstanding research record commensurate with the level of appointment. Specializations in all accounting subfields are encouraged to apply. Teaching load and salary are competitive with research universities. The starting date is August 2012. All applications will be considered strictly confidential. The University of North Carolina at Charlotte is an affirmative action, equal opportunity employer. Women, members of minority groups, and persons with disabilities are encouraged to apply. The review of applications will begin immediately and applications will be accepted until the position is filled. Applicants are subject to a criminal background check. TO APPLY: Apply electronically at https://jobs.uncc.edu If you have any questions concerning this position(s), please contact Associate Professor, Chair of the Search Committee, at jmcathey@uncc.edu or (704) 687-7690. Only electronic submissions will be accepted. Please attach the following documents with your electronic submission: application letter and *vita*. Finalists will be asked to forward official transcripts, letters of reference, and other supportive materials as requested by the search committee.

THE UNIVERSITY OF WEST FLORIDA, College Of Business, invites applications for one tenure-track Assistant/Associate Professor; pos. no. 10281; in Accounting available August 2012, dependent upon funding. Primary teaching duties will be undergraduate and graduate courses in Auditing and Systems with preference given to candidates who can also teach in Financial, Governmental/Non-Profit, or Cost Accounting. Salary is commensurate with experience. Preferred candidates will have a Ph.D. in field from an AACSB-accredited school, relevant professional experience, and relevant certification at the time of appointment. ABDs may be considered, but must provide evidence the doctoral degree will be completed prior to August 2012. To apply, go to https://jobs.uwf.edu Contact: Ms. Teri Foster at 850-474-2719, tfoster@uwf.edu. Persons hired must have proof of legal authority to work in the United States. Any person requiring special accommodations to respond may contact the UWF Americans with Disabilities Act Office at 1-850-473-7469 (Voice) or 1-850-857-6114 (TTY).

THE UNIVERSITY OF OKLAHOMA, John T. Steed School of Accounting, invites applications for the position of Assistant Professor. Candidates must possess an appropriate doctorate or be near completion. Candidates must have academic training which indicates the potential for significant high quality academic research. The anticipated appointment date is August 15, 2012. All qualified individuals are encouraged to submit application materials to: January Nelson, Managerial Associate, Steed School of Accounting, Price College of Business, University of Oklahoma, 307 W. Brooks, AH 200, Norman, Oklahoma 73019–4004 email: jnelson@ou.edu, phone: 405.325.4223, fax: 405.325.7348. For questions you may contact the search committee chair, Wayne Thomas: wthomas@ou.edu. The screening of applications will begin November 1, 2011. Applications will be accepted until the position is filled. The University of Oklahoma is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

WESTERN NEW ENGLAND UNIVERSITY invites applications for a tenure-track Assistant/Associate Professor accounting position to begin August 2012. Candidates are expected to hold a doctorate in accounting or anticipate having completed all degree requirements by the starting date. The successful candidate will demonstrate a strong commitment to teaching in the undergraduate and graduate programs and to publishing scholarly research. An interest in teaching financial accounting or auditing is desirable. Western New England University is a private, independent, coeducational institution founded in 1919 and located on an attractive 215-acre suburban campus in Springfield, Massachusetts within easy access of Boston and New York City. More information about the University is available at www.wne.edu Send *vita*, teaching evaluations, research manuscript, and reference information to: Dr. Julie Siciliano, Dean, College of Business, Western New England University, 1215 Wilbraham Road, Springfield, MA 01119. Electronic submissions are encouraged and should be sent to acctprof@wne.edu. Western New England University is an Equal Opportunity Employer.

UNIVERSITY OF SOUTHERN INDIANA, College of Business, invites applications for a tenure-track position in accounting beginning August 2012. Candidates seeking the rank of Assistant Professor should have a Ph.D. or D.B.A. in Accounting (or a related discipline), but ABDs will be considered at the rank of instructor until completion of their degree. Responsibilities include innovative teaching in areas consistent with the candidate's interests and accounting program needs, active scholarship, and service at the program, university, and community levels. The college values continuing self-development in scholarship, teaching, and service consistent with AACSB standards, and collaborative interactions with colleagues. A new College of Business building incorporates state-of-the-art technologies and several specialized learning laboratory classrooms. The organizational culture of the college rewards innovative approaches to activities at all stages of its value chain. The successful candidate should have a strong desire for community engagement via continuous interaction with the local area businesses and organizations. To apply, please send a letter of application, your *curriculum vita*, teaching philosophy statement, and evidence of teaching effectiveness (if available) and scholarship to: Mary Spahn, College of Business, University of Southern Indiana, 8600 University Blvd., Evansville, IN 47712. Please contact Ms. Spahn at 812–464–1979 or mespahn@usi.edu if you have any questions.

UNIVERSITY OF MICHIGAN–FLINT, Financial Accounting, seeks highly qualified applicants for a tenure-track position in Accounting for Fall 2012. Academic rank is open. Candidates should possess an earned doctorate in the appropriate field or a closely related area (ABDs considered). The primary area of specialization is Financial Accounting and the secondary areas are open, with teaching at both the undergraduate and graduate levels. Our program enjoys an excellent regional reputation of quality. The city of Flint has developed into a vibrant campus town. Salary is competitive and depends upon qualifications. UM-Flint's business programs are accredited by AACSB-International. Applicants should submit, preferably via email, a résumé, sample of professional writing, course evaluations, names, addresses, and phone numbers of at least three references to: Dennis Fattaleh, School of Management, University of Michigan-Flint, Flint, MI 48502–1950; Phone: (810) 237–6681. The school encourages minority candidates. The University of Michigan-Flint is a non-discriminatory, Equal Opportunity/Affirmative Action Employer. Email: fattaleh@umflint.edu. The position will remain open until filled.

FORDHAM UNIVERSITY, Schools of Business, invite applications for tenure-line faculty positions at all ranks, effective Fall 2012. We are interested in strong expertise in any accounting area. Candidates must have earned a doctorate in Accounting or Taxation by August 2012 and have a strong commitment to research and teaching. Appointment to associate or full professor will be based on the record of quality research and teaching. Fordham University is an independent, Catholic university in the Jesuit tradition that welcomes applications from men and women of all backgrounds. Fordham University is an Affirmative Action/Equal Opportunity employer. Fordham Business Schools are accredited by the AACSB. Applications should include *curriculum vitae*, three letters of reference, and an example of scholarly work and send to: Professor Harry Newman, Fordham University, 1790 Broadway, 13th Floor, New York, NY 10019; or email at hnewman@fordham.edu.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES invites applications for a full-time Professor position in the areas of Governmental Accounting, International Accounting Standards, Audit/Fraud, Accounting Information Systems, Tax Accounting, Financial, or Managerial Accounting. Start date is September, 2012. A doctoral degree must be from an accredited institution of higher education in accounting. Applicants must be academically qualified according to the AACSB standards. Ph.D. or equivalent is required for retention after two years. Preference will be given to candidates with Ph.D. or equivalent at the time of employment. Please send a letter of application, *curriculum vitae*, three letters of recommendation, and transcript from institution awarding highest degree to: Dr. Kathryn Hansen, Chair, College of Business and Economics, Department of Accounting, California State University, Los Angeles, 5151 State University Drive, ST F517 Los Angeles, CA 90032–8121. An Equal Opportunity/Title IX Employer. Please see detailed description of position at: http://www.calstatela.edu/academic/position/Templates/7_12_11_Act.php

NIAGARA UNIVERSITY, a private Catholic institution sponsored by the Vincentian Community, invites applications for a tenure-track Assistant/Associate Professor in Accounting opening starting in Fall 2012 (subject to budget approval). The position is in the Department of Accounting in the College of Business Administration (AACSB-accredited). Applicants must have a Ph.D. in Accounting or equivalent degree; ABDs may also apply. All areas in accounting expertise will be considered, but preference will be given to candidates with strong backgrounds in AIS, accounting theory, and auditing. Professional certification is desired. Teaching responsibilities will include undergraduate and M.B.A. level courses. Candidates should have strong teaching, research and service orientations. Interested candidates should forward a *curriculum vita*, letter of intent, writing sample, evidence of teaching effectiveness, and contact information for three references to: Dr. Lei Han, Assistant Professor of Accounting, College of Business Administration, Niagara University, New York, 14109 via lhan@niagara.edu. Applications will be accepted until the position is filled. Niagara University is an equal opportunity/affirmative action employer. Minorities and women are encouraged to apply.

MANHATTAN COLLEGE, The Manhattan College School of Business, an AACSB-accredited school, seeks applicants for two (2) tenure-track positions in Accounting, beginning in Fall 2011. Rank will be commensurate with qualifications. Candidates must have a Ph.D. or D.B.A. in Accounting or in a related field. (Applicants expecting a doctoral degree relatively soon will be considered.) Candidates must provide evidence of teaching effectiveness and research accomplishments. Responsibilities include teaching undergraduate and graduate courses in Accounting and engaging in scholarly activities and participating in campus activities. The Department seeks candidates with expertise in tax, IT auditing, and accounting systems, but all qualified candidates are encouraged to apply. Interested candidates should submit: a letter of application, a *curriculum vita*, evidence of teaching effectiveness, a sample of current research, and three letters of references. All materials should be submitted to: Dr. Mehmet Ulema at mehmet.ulema@manhattan.edu, subject line: Accounting Position. Application review will begin immediately and continue until the position is filled. Manhattan College is an independent Catholic Coeducational institution in the LaSallian tradition located in the Riverdale section of New York City http://www.manhattan.edu We expect our faculty, administration and staff to be knowledgeable about our mission and to make a positive contribution to that mission. Women and minorities are encouraged to apply. We are committed to diverse campus community. AA/EO Employer M/F/D/V. Manhattan College is an Affirmative Action, Equal Opportunity institution and welcomes applications from diverse candidates.

INDIANA UNIVERSITY, Kelley School of Business, Department of Accounting, invites applications for tenure-track/tenured faculty positions at the associate or full level effective Fall 2012. Preference will be given to those with teaching and research interests in Financial Accounting. Compensation levels are competitive. Candidates must possess a doctoral degree and have a strong commitment to excellence in scholarly research and teaching. Interested candidates should send a current *vita*, a research paper suitable for presentation at a workshop, three letters of reference (six for tenured offers), and evidence of teaching ability to the contact person indicated below. Applications received before November 30, 2011 will be given full consideration. Contact address: Laureen Maines, Chair, Department of Accounting, Kelley School of Business, 1309 E. 10th Street, Suite 540, Bloomington, IN 47405–1701, lmaines@indiana.edu. Indiana University is an Affirmative Action Equal Opportunity Employer committed to excellence through diversity. The University actively encourages applications of women, minorities, and persons with disabilities.

UNIVERSITY AT ALBANY, State University of New York, Department of Accounting and Law, invites applications for one tenure-track position at the Assistant Professor level starting September 2012, subject to budgetary approval. The candidate should have a doctoral degree in accounting from a college or university accredited by a U.S. Department of Education (DOE) or internationally recognized accrediting organization or be ABD in accounting from such an institution. While all areas will be considered, candidates with strong research and teaching interests in Auditing, Assurance and/or Forensic related areas are particularly desired. Evidence of a strong commitment to scholarly research and excellence in teaching, and a demonstrated ability to work with and/or instruct diverse groups of people is required. CPA (or other applicable professional certification) and/or professional experience is highly desirable. Ph.D. or ABD in accounting is required. Evidence of the ability to provide quality classroom instruction in accounting is required. Evidence of the ability to publish quality research in accounting is required. CPA or other professional certification desirable. Professional experience desirable. Contact Ingrid E. Fisher at ifisher@uamail.albany.edu. Apply for the position at http://www.albany.edu

UNIVERSITY OF INDIANAPOLIS, School of Business, is seeking applications for an Assistant Professor of Accounting. This is a full-time, nine-month, tenure-track position with a start date of August 2012. The successful candidate will participate in teaching, service, and scholarship as it relates to the field of accounting. The ideal candidate will have a strong background in teaching at the undergraduate level for accounting and non-accounting majors. The ability to teach introductory financial and managerial accounting from a user's perspective is required. Experience with accounting information systems, specifically using Microsoft Dynamics, is preferred. Qualifications: Earned doctorate in accounting or closely related field. ABD candidates may apply. Professionally qualified candidate with an M.B.A./CPA may be considered for a non-tenure-track appointment. Candidates must have demonstrated proficiency in teaching and knowledge of the accounting field. Applied scholarship and active participation in the discipline is a plus. Apply electronically at http://www.uindy.edu/visitors/hr Review of applications will begin immediately and continue until the position is filled. The University of Indianapolis is an affirmative action/equal opportunity employer and encourages applications from women and minorities.

UNIVERSITY OF OREGON, Department of Accounting, Lundquist College of Business, is seeking to fill one tenure-track position in accounting. Rank: Assistant Professor. Employment Beginning: September 16, 2012. Description: The Lundquist College is committed to publishing research in top accounting journals, providing a high level of service to students and interacting with the professional community. Responsibilities include teaching accounting courses at the undergraduate and graduate levels as well as supervising Ph.D. students. Promotion and tenure depend on the quality of research and teaching. The successful candidate will have the ability to work effectively with faculty, staff, and students from diverse backgrounds. Qualifications: Completed Ph.D. degree by summer 2012 with demonstrated potential for teaching and the ability to publish economics-based research in high quality academic journals. Salary: Competitive. Application Procedure: Send letter of interest, *curriculum vitae*, copies of research papers, evidence of teaching performance, and three letters of reference to the following email address: ActgOpenSearch@lcbmail.uoregon.edu Application Deadline: Review of applications begins December 1, 2011 and will continue until a suitable candidate is identified. The University of Oregon is an equal opportunity, affirmative-action institution committed to cultural diversity and compliance with the Americans with Disabilities Act.

UNIVERSITY OF COLORADO, COLORADO SPRINGS (UCCS), College of Business, has a position for a tenure-track faculty member in the Taxation area. Both the Assistant and Associate Professor ranks will be considered. Preference will be given to applicants possessing a completed doctorate in accounting from an accredited business school. ABD applicants must have completed all doctoral course requirements and qualifying exams and must also persuasively demonstrate that all degree requirements will be completed within one year of hiring. Interested applicants are required to apply online at www.jobsatcu.com and refer to posting number 814286. UCCS fosters equity in employment by promoting diversity and assuring inclusiveness. UCCS is also dedicated to ensuring a safe and secure environment for our faculty, staff, students, and visitors; therefore, we conduct background investigations for prospective employees. Preference will be given to applicants who have the legal right to work in the United States.

BRIDGEWATER STATE UNIVERSITY, Ricciardi College of Business, invites applications for a position in Accounting at the Assistant Professor level with a beginning date of August, 2012. The holder of this tenure-track position will be expected to teach at both the undergraduate and graduate (M.B.A. & M.S.A.) level. Teaching opportunities exist in all areas of accounting. Required Minimum Qualifications: A doctorate in Accounting or related subject is required, preferably from an AACSB-International accredited institution. ABDs from an accredited institution will also be considered, if there is strong evidence that the doctorate degree will be completed before the appointment date. Those applying must have or demonstrate the potential to develop an ongoing program of research. Applicants should be strongly committed to excellence in teaching and advising, and to working in a multicultural environment that fosters diversity. They should also have an ability to use technology effectively in teaching and learning, the ability to work collaboratively, evidence of scholarly activity, and a commitment to public higher education. Preferred Qualifications: (1) teaching experience at the university level, and (2) relevant professional non-academic work experience and ability to develop strong linkages with the business community. Special Instructions to Applicants: Applications, including (1) a cover letter, (2) a *curriculum vitae* that includes contact information for three references, (3) summary information on courses taught and student evaluations, and (4) a brief statement that describes research interests and teaching philosophy may be submitted at: http://jobs.bridgew.edu Review of applications continues until positions are filled. Bridgewater State University is an affirmative action/equal opportunity employer which actively seeks to increase the diversity of its workforce.

UNIVERSITY OF CALGARY, Haskayne School of Business, is seeking qualified candidates to fill a tenure-track position at the Assistant/Associate Professor level in the Accounting Area. The successful candidate will be expected to teach undergraduate and graduate courses in financial accounting, managerial accounting, auditing, or taxation. The anticipated starting date is July 1, 2012. Accredited by AACSB International, the Haskayne School of Business is a progressive and innovative business school. Our mission is to create and communicate knowledge of critical significance while contributing to the development of our students as ethical and professional leaders. The applicant should have a Ph.D. She/he will also be expected to take an active role in research and participate in university community service. The applicant must provide evidence of effective teaching at the university level. An applicant must show a record of scholarly publications and an active research profile. Interested individuals should submit their *curriculum vitae*, along with the names of three references and examples of teaching evaluations to: Philip Beaulieu, Ph.D. Chair, Recruiting Committee, Haskayne School of Business, University of Calgary, 2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4. Telephone: 403–220-7304; Fax: 403–210-2217; Email: philip.beaulieu@haskayne.ucalgary.ca. All applications received before January 1, 2012 will receive full consideration. The position will remain open until filled.

BELMONT ABBEY COLLEGE invites applications for a tenure-track position in Accounting, to begin as soon as January 2012 or as late as August 2012. A doctorate in Accounting or a related field with a minimum of 18 graduate hours in accounting is required and must be completed by August 2012. Related business experience would also be appropriate. Teaching both traditional day and Adult Degree Program night classes is required, with a 4/4 teaching load. In addition to excellence in teaching, academic advising, service to the college and community, continuing scholarly development and contribution to the mission of the college are expected. Academic rank and salary will be commensurate with candidate's credentials. Review of applications will begin immediately. Please send letter of application, *vita*, names and contact information for at least three references to: Dr. Angela Blackwood, Chair Accounting Department, Belmont Abbey College, 100 Belmont-Mt. Holly Road, Belmont, NC 28012 angelablackwood@bac.edu.

INDIANA UNIVERSITY SOUTHEAST, School of Business, is currently seeking applicants for a tenure track appointment beginning in Fall 2012 for a Ph.D. in accounting. Candidate will teach auditing, with secondary area of financial reporting or managerial accounting. Ph.D. in accountancy required. CPA/CMA is desirable. Professional work experience preferred. Applicants will be accepted until the position is filled. Starting date is August 1, 2012. Applicants should send *vita*, three letters of recommendation and transcript to: hr@ius.edu. Attention: Tenure-Track in Accounting-Search and Screen Committee. For additional information about the position, call Professor Doug Barney, Chair, Search and Screen Committee at 812–941-2532. Indiana University Southeast is one of eight campuses in the Indiana University system. We are dedicated to providing high-quality education and lifetime growth opportunities for the people of Southern Indiana and the Greater Louisville region. Currently over 7,000 students are enrolled in 6 master's degree programs (including two in the School of Business) and 38 bachelor's degree programs. For more information on our campus and the School of Business please visit www.ius.edu. Consistent with the university's commitment to diversity, persons from traditionally under-represented groups are strongly encouraged to apply. Indian University Southeast is an Affirmative Action Equal Opportunity Employer.

GEORGIA INSTITUTE OF TECHNOLOGY, College of Management, is seeking candidates for a faculty position starting August, 2012. Rank is open. The minimum qualifications for this vacancy is a Ph.D. in Accounting or related discipline, excellent scholarly research, as well as demonstrated experience in teaching undergraduate and graduate students. Salary and a teaching load of three semester courses per year are competitive with leading research universities, with opportunities for involvement in executive programs. Please submit the following to: recruit-accounting@mgt.gatech.edu: A cover letter and *vita*, up to three research papers with your name in the filename, three letters of recommendation with your name in the filename. Packages sent by mail will not be accepted. All documents must be in Microsoft Word or Adobe PDF format. The application deadline is January 15, 2012. A part of the recruiting process involves voluntary submission of statistical information on our applicants. Please complete the form found at: http://mgt.gatech.edu/downloads/ga_tech_disclosure.doc and email it to vdf_email@mgt.gatech.edu. Georgia Tech is an equal opportunity/affirmative action employer which values diversity.

SAMFORD UNIVERSITY, Brock School of Business, invites applications for a tenure-track accounting faculty position in the Department of Accounting and Management Information Systems that will begin with the Fall term of 2012. Required qualifications include an earned doctorate in accounting with credentials sufficient to support an appointment at the rank of assistant, associate, or full professor. Expertise in the area of systems and professional certifications will be viewed favorably. Applicants for this position should show promise for effective classroom teaching and the production of scholarly publications, as well as the ability and willingness to interface with the professional accounting community. Candidates must be willing to support the university's Christian mission. The Brock School of Business is accredited by AACSB International and hosts more than 500 students in its undergraduate, M.Acc., and M.B.A. programs. Please send a cover letter and a current *vita* with three references to: Dr. Lowell S. Broom, Brock School of Business, Samford University, 800 Lakeshore Drive, Birmingham, AL 35229 or electronically at: lbroom@samford.edu. Samford University is an Equal Opportunity Institution that complies with applicable law prohibiting discrimination in its educational and employment policies and does not unlawfully discriminate on the basis of race, color, sex, age, disability, or national or ethnic origin.

KUTZTOWN UNIVERSITY OF PENNSYLVANIA, Department of Business Administration, announces at least one tenure-track faculty position to teach Accounting, beginning in Spring or Fall of 2012. As part of an energetic faculty you will be teaching undergraduate accounting courses with the opportunity to teach in the M.B.A. program. Ph.D. or D.B.A. in Accounting or closely related area is preferred. "ABD" in Accounting with expected completion with one year will be considered. Kutztown University is located in a beautiful semi-rural area two hours from New York City and one hour from Philadelphia. Kutztown University is one of fourteen universities that comprise the Pennsylvania State System of Higher Education. Apply to the position by contacting Dr. Therese A. Maskulka at maskulka@kutztown.edu.

EDINBORO UNIVERSITY OF PENNSYLVANIA is seeking applicants. Responsibilities: Teach principles of accounting, managerial accounting, and upper-level courses in accounting based on the needs of the department and the qualifications of the candidate. Qualifications: Ph.D. or D.B.A. in accounting required. Candidate must be academically qualified according to AACSB standards. Preference will be for candidates with a doctorate degree from an AACSB-accredited school and evidence of refereed publications. ABD candidates will be considered so long as they have reasonable expectation of degree completion by August 2012. Teaching or equivalent professional work experience expected. Candidate should submit teaching evaluations if available. School of Business: The School offers concentrations in accounting, forensic accounting, comprehensive business administration, financial services, management information systems, and marketing. The Business programs are accredited by ACBSP with AACSB accreditation currently being pursued. Our mission focuses on a commitment to student opportunity, quality teaching and quality student advisement, whether the student participates in our programs on main campus, at a regional campus or online. The school offers the possibility of a reduced teaching load and summer support for research and the faculty has access to the COMPUSTAT database for classroom and individual research. Application Procedure: Interested applicants may post a *curriculum vita* through this service. A full application will require a *curriculum vita*, names and contact information for at least three references, official graduate transcripts, and teaching evaluation information (if available). Please wait to be contact to provide information beyond the *curriculum vitae*. Contact mailing address is as follows: Dr. Michael J. Hannan, Dean, School of Business, 112 Wiley Arts & Sciences Center, Edinboro University of PA, Edinboro, PA, 16444. Position Start: January 2012 or August 2012, pending funding approval.

UNIVERSITY OF COLORADO, COLORADO SPRINGS (UCCS), College of Business, has a position for a tenure-track faculty member. All areas will be considered. Both the Assistant and Associate Professor ranks will be considered. Preference will be given to applicants possessing a completed doctorate in accounting from an accredited business school. ABD applicants must have completed all doctoral course requirements and qualifying exams and must also persuasively demonstrate that all degree requirements will be completed within one year of hiring. Interested applicants are required to apply online at: www.jobsatcu.com and refer to posting number 814321. UCCS fosters equity in employment by promoting diversity and assuring inclusiveness. UCCS is also dedicated to ensuring a safe and secure environment for our faculty, staff, students, and visitors; therefore, we conduct background investigations for prospective employees. Preference will be given to applicants who have the legal right to work in the United States.

THE UNIVERSITY OF LETHBRIDGE is seeking applications for two tenured or tenure-track positions in accounting commencing July 2012 at our Calgary campus at any rank. For one position we are looking for persons with research and teaching interests in financial accounting. For the second position the research and teaching interests are open. Applicants should possess either a doctorate or be finishing their dissertation. Professional certification is preferred. A commitment to teaching excellence and publishing research in quality journals is required. We offer four course teaching loads per academic year, paid study leaves, and other benefits. Providing an urban setting with a population of over one million people, Calgary is close to outdoor activities available at Banff National Park, Lake Louise and four world renowned ski resorts. Alberta is presently the economic growth engine of Canada, with the lowest tax rates in the country. Email your application directly to: management.dean@uleth.ca including a *curriculum vita*, teaching evaluations, evidence of research effectiveness, and three reference letters. Review of applications begins immediately and will continue until the positions are filled.

UNIVERSITY OF WISCONSIN–STEVENS POINT is accepting applications for Assistant Professor of Accounting. The successful candidate will teach introductory and advanced courses in accounting, with preference given to an interest in Auditing. The School of Business and Economics is in an exciting period of change as it currently pursues AACSB accreditation. The University of Wisconsin-Stevens Point is a leading four-year comprehensive institution located in scenic Central Wisconsin. It has consistently been named one of the top public mid-western universities in U.S. News and World Report's college rankings. Prefer Ph.D./D.B.A. in accounting from an AACSB-accredited institution. ABD will be considered. Ph.D. required for tenure. Please check our website for full position description. Send a letter of application including primary areas of teaching interest, résumé or *vita*, copies of transcripts, and a list of three references to: Dr. Gary Mullins, Head, School of Business & Economics, University of Wisconsin-Stevens Point, Stevens Point, WI 54481–3897. Email: gmullins@uwsp.edu

UNIVERSITY OF ST. THOMAS, Minneapolis/St. Paul, invites applicants for a tenure-track Accounting position starting Fall 2012. All areas are needed. The University of St. Thomas offers a B.A., M.B.A., and M.S. in Accountancy. See our website at www.stthomas.edu Candidates should have a Ph.D. (ABD with a close completion date will be considered), D.B.A., or other appropriate terminal qualifications. Preference will be given to candidates who blend academic credentials and professional experience. Applicants should send a letter, *curriculum vitae*, evidence of teaching ability, a sample of scholarly writing, and three letters of recommendation to: Terence Pitre, Accounting Department Search Committee Co-Chair, Department of Accounting, Opus College of Business, Mail #TMH443, University of St. Thomas, 1000 LaSalle Avenue, Minneapolis, MN 55403–2005. Email: pitreter@stthomas.edu. More detailed information is available at http://www.careerexchange.com/cejobs/catresponseUSTFaculty.asp The University of St. Thomas is an Affirmative Action and Equal Opportunity Employer.

THE UNIVERSITY OF VERMONT, School of Business Administration, AACSB-accredited, invites applications for a tenure-track position in Accounting at the Assistant Professor level beginning Fall 2012. Candidates must hold a doctoral degree from an AACSB-accredited school. ABDs will be considered if completion of the degree is expected prior to the start date. All areas of Accounting will be considered; preference will be given to candidates with prior professional work experience and an interest in tax, managerial, or not-for-profit/government. Candidates should have a strong commitment to excellence in scholarly research and undergraduate and master's-level teaching. Salary and benefits are competitive. Applications must be submitted through the UVM website www.uvmjobs.com Applicants should submit a letter of application, current *curriculum vitae*, a research statement, evidence of teaching effectiveness and the names of three references. Qualified applicants with inquiries may contact the Search Committee Chair, Dr. Susan B. Hughes at shughes@uvm.edu. Applications will begin immediately and continue until the position is filled. Information about the University and the School of Business can be found at www.uvm.edu and www.bsad.uvm.edu The University is especially interested in candidates who can contribute to the diversity and excellence of the academic community through their research, teaching, and/or service. Applicants are requested to include in their cover letter information about how they will further this goal. The University of Vermont is an Affirmative Action/Equal Opportunity employer. The School of Business Administration is committed to increasing faculty diversity and welcomes applications from women and underrepresented ethnic, racial and cultural groups and from people with disabilities.

UNIVERSITY OF WISCONSIN–LA CROSSE, AACSB-accredited, College of Business Administration, invites applications for one (two) tenure-track accounting positions in its Department of Accountancy starting January or August 2012. Position responsibilities include teaching, scholarship, and service. Candidates seeking rank of Assistant or Associate Professor should possess a Ph.D. or D.B.A. in Accounting (or related discipline). ABDs will be considered at instructor level until completion of degree. Preference given candidates with primary specialization in Audit or Financial. Other areas considered. Professional certification is highly desirable. UW-L students achieve high first-time passage rates on CPA exam. The college values continuing development in teaching and scholarship consistent with AACSB standards. UW-La Crosse is an equal opportunity employer committed to increasing the diversity of its workforce. Review of applications will begin September 1, 2011 and continue until positions are filled. For additional information about this position and to apply, please visit https://employment.uwlax.edu/

PENNSYLVANIA STATE ERIE, Behrend College, Sam and Irene Black School of Business, is seeking applicants for a tenure-track position in accounting at all ranks for Fall 2012. Candidates must possess an appropriate doctorate in accounting by September 1, 2012, a record of published research or research potential, and evidence of teaching effectiveness. Primary teaching interests in auditing and accounting information systems are preferred, but applicants with other areas of interest will be considered. Responsibilities include undergraduate and M.B.A. courses, preferably in accounting information systems and auditing. This position may also involve teaching in the University's on-line M.B.A. program (iMBA) offered through Pennsylvania State's World campus. Salary is competitive with AACSB-accredited schools of business. Please address letter of application with a *vita*, copies of recent student evaluations, one research writing sample, and three letters of recommendation to: Accounting Search Committee, Pennsylvania State Erie, Sam and Irene Black School of Business, Box ACCTG12AAAR, 5101 Jordan Road, Erie PA 16563–1400. Pennsylvania State is committed to affirmative action, equal opportunity and the diversity of its workforce.

THE UNIVERSITY OF SCRANTON, Kania School of Management (AACSB), invites applications for its tenure-track position in Accounting Information Systems & Auditing beginning August 2012, at the rank of Assistant Professor. Duties include teaching primarily AIS and auditing, at the undergraduate and graduate levels, scholarly research activities meeting AACSB-related criteria, and service. An ability to teach writing intensive and accounting communications courses is desirable. The qualifications for the position include an appropriate earned doctorate from an AACSB-accredited institution or ABD progressing towards completion. Applications (cover letter, *vita*, transcripts, teaching evaluations, and contact information for three references) may be submitted to: accounting@scranton.edu. Applications will be considered until the position is filled. The University of Scranton is, by tradition and choice, a Catholic and Jesuit university. For more information visit http://matrix.scranton.edu/academics/ksom/index.shtml The University of Scranton is an EOE/Affirmative Action Employer/Educator.

BOCCONI UNIVERSITY, Accounting Department, invites applications for tenure-track positions at the level of Assistant/Associate Professor. Courses are to be taught in English. Knowledge of Italian is not required. A competitive salary with other top European Schools is offered, along with additional research-related funding and benefits. Candidates should have a completed (or close to completed) Ph.D. with focus on Accounting. Applicants are expected to have a demonstrated potential for, or history of, outstanding research and strong teaching skills. Applicants should send their résumé, samples of research and three letters of reference via email with attachments (Word or PDF files preferred) to: recruiting@unibocconi.it. For further academic information please contact: Professor Sasson Bar-Yosef, sasson.baryosef@unibocconi.it.

THE UNIVERSITY OF AKRON is seeking an Assistant/Associate/Professor of Accounting (Financial Reporting) teaching sophomore, junior, senior, and graduate courses and engaging in research and scholarship activities. A Ph.D. in accounting from an AACSB-accredited institution or equivalent required. All applicants must be academically qualified under AACSB standards and must demonstrate a commitment to teaching excellence and to publishing high quality research in peer-reviewed journals. Applicants must also demonstrate ability and commitment to contribute to the School's mission through service to the School, College, University, the profession and the discipline. Preference shall be given to individuals with teaching and research interests in financial reporting and a related area. Professional certification is highly desirable. Also desirable are professional experience and ability to work closely with the professional accounting/tax community. For complete details and to apply visit www.uakron.edu/jobs Requisition number 006563. EEO/AA.

CALIFORNIA STATE POLYTECHNIC UNIVERSITY AT POMONA (Cal Poly Pomona), Accounting Department, invites applications for one tenure-track position at Assistant or Associate Professor with specialization in one or more of the following areas to begin Fall quarter 2012: auditing, taxation, not-for-profit accounting. Candidates must have a Ph.D./D.B.A. in Accounting from an AACSB-accredited school. The department is especially interested in candidates who can contribute to the diversity and

excellence of the academic community through their research, teaching, and/or service, and are committed to teaching and working in a multicultural environment. Full position description and application instructions can be found at http://www.csupomona.edu/~academic/faculty/positions/bus_acc_09.htm (need to be set up) The position is open until filled. Early response is encouraged. Cal Poly Pomona is an Equal Opportunity, Affirmative Action Employer, hires only individuals lawfully authorized to work in the U.S.

SENIOR ASSISTANT/ASSOCIATE/FULL PROFESSOR

Department of Accounting

University of Texas at El Paso - College of Business Administration

POSITION DESCRIPTION: The Department of Accounting in the College of Business Administration at The University of Texas at El Paso (UTEP) invites applications for a tenure-track position at the Senior Assistant, Associate or Full Professor level; the expected start date is Fall 2012. The assignment location is El Paso, Texas. Responsibilities include scholarly research and publishing findings in top accounting academic journals, good pedagogy at the graduate level, and service on faculty committees. The successful candidate will be expected to participate in the College's International Business Ph.D. Program.

The Department of Accounting is part of the College of Business Administration, both of which are AACSB accredited. The college also includes Departments of Economics and Finance, Information and Decision Sciences, and Marketing and Management. For more information regarding the Department of Accounting at UTEP, please visit our website: **http://business.utep.edu/accounting.**

REQUIRED QUALIFICATIONS: Applicants must have an earned doctorate from an AACSB accredited university and a demonstrated record of accomplishment in publication, teaching, and service with a current research record consistent with the University's continued efforts toward becoming a National Research University (Tier 1).

PREFERRED QUALIFICATIONS: Specialization/experience in the areas of Auditing and/or Taxation.

SALARY: Salary and benefits are AACSB competitive and appropriate for experience and qualifications.

APPLICATION PROCEDURE: Review of applications will begin immediately and applications will be accepted until the position is filled. Applicants must submit letter of interest (indicating the rank at which they want to be considered), curriculum vita and 3 letters of recommendation to:

Gary Braun, Search Committee Chair, Department of Accounting
University of Texas at El Paso
500 W. University Ave
El Paso, TX 79968-0542
or email: gbraun@utep.edu

The University of Texas at El Paso is an Equal Opportunity/Affirmative Action employer. The University does not discriminate on the basis of race, color, national origin, sex, religion, age, disability, veteran status, or sexual orientation in employment or the provision of services.

UNIVERSITY OF TEXAS AT EL PASO

HUMBOLDT STATE UNIVERSITY

A California State University

Tenure Track Faculty Position

Accounting - School of Business

Humboldt State University's School of Business invites nominations and applications for an academic year, tenure-track faculty position in Accounting. The successful candidate will work collaboratively to provide instruction, program development, scholarly leadership, and will work with the broader HSU community to elevate the University's vision and commitment to innovation, student-faculty interaction, experiential learning, and student success. We are seeking candidates who are interested in building a program that will leverage the distinctiveness of our university in the areas of green business and sustainability. This position is open until filled. First consideration will be given to completed application packages received no later than October 15, 2011. For more information and to apply visit: **http://apptrkr.com/194885**

Humboldt State University is committed to achieving the goals of equal opportunity and endeavors to employ faculty and staff of the highest quality reflecting the ethnic and cultural diversity of the state. The University is an Equal Opportunity/Title IX/ADA Employer.

Tulane University
FREEMAN SCHOOL OF BUSINESS

The A. B. Freeman School of Business and Dean Ira Solomon are seeking research-oriented faculty to fill the following positions beginning fall 2012:

ACCOUNTING
Visiting and/or Tenure-Track Assistant Professor, Associate Professor or Full Professor/ Chair

We also are seeking outstanding individuals with significant practice experience and promise for excellence as educators to serve as Professors of Practice.

Candidates must hold a PhD or have a definite plan for completion of dissertation prior to the date of employment. Applicants must have credentials and experience commensurate with appointments at these rank levels. These positions are subject to a final university determination on funding. Women and minorities are encouraged to apply. Please email your applications by January 15, 2012 to spindt@tulane.edu.

Professor Paul Spindt
Senior Associate Dean
A.B. FREEMAN SCHOOL OF BUSINESS
TULANE UNIVERSITY
SUITE 440
NEW ORLEANS, LA 70118-5669

TULANE UNIVERSITY IS AN AFFIRMATIVE ACTION/ EQUAL OPPORTUNITY EMPLOYER

AMERICAN UNIVERSITY – KOGOD SCHOOL OF BUSINESS
Position Announcement – Assistant/Associate/Full Professor of Accounting

The Kogod School of Business at American University invites applications and nominations for two tenure-track appointments in Accounting at any rank to begin in Fall 2012. Applicants should have a Ph.D. in Accounting or should anticipate completing the degree within a short period following initial employment. Candidates should be effective teachers and should be strongly committed to excellence in scholarly research.

We welcome applications from candidates engaged in high-quality scholarship in all areas of accounting (including but not limited to audit, financial, managerial and tax) and research methods (including but not limited to analytical, empirical archival, experimental, or field). The Accounting Department currently has ten tenure-line faculty members in a highly collegial environment. Our active research faculty have published in such journals as *The Accounting Review, Contemporary Accounting Research, Journal of Accounting Research, Journal of Accounting and Public Policy, Journal of International Accounting Research, Journal of Taxation,* and *Auditing: A Journal of Practice and Theory.*

In addition to scholarly research, responsibilities will include undergraduate and masters-level teaching, and participation in department, school and university activities. We are particularly interested in candidates with teaching interests in auditing/information systems, managerial accounting, taxation, and advanced financial accounting, but all areas will be considered.

Salary and benefits are competitive. Review of applications will begin immediately and will continue until the position is filled. Depending on qualifications, the appointee to this position may be recommended for tenure at the time of hiring. Applications are preferred in electronic format, via email at the address below. Please include ACCOUNTING TENURE-TRACK POSITION in the subject line of your email. Applications should include a letter of application, curriculum vita, three letters of recommendation, recent teaching evaluations (when possible), and copies of recent published papers or working papers. Please send to:

Susan Krische, Accounting Search Committee Chair
c/o Takei Roach, Kogod Academic Affairs Coordinator
Kogod School of Business, American University
4400 Massachusetts Avenue N.W., Washington, D.C. 20016-8044
Tel: (202) 885-1963 Email: takei@american.edu

American University is a private institution with a total enrollment of approximately 11,000 students, situated on a beautiful 84-acre campus in one of the most attractive residential areas in the District of Columbia. American University is within easy reach of the many centers of government, business, research, and the arts located within the nation's capital. For more information about American University, see http://www.american.edu/.

Established in 1955, the Kogod School of Business offers both undergraduate and graduate degree programs and is one of the leading business schools in Washington, DC. Kogod encourages interdisciplinary study through collaboration with other academic programs within American University. Learn more about Kogod at http://www.kogod.american.edu/ and about our Accounting Department faculty at http://www.american.edu/kogod/research/accounting.cfm. American University is an equal opportunity, affirmative action employer committed to a diverse faculty, staff and student body. Women and minorities are strongly encouraged to apply.

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- AICPA publications
- International Federation of Accountants (IFAC) standards
- Tax law reviews from top institutions such as New York University, Stanford, Vanderbilt, and University of Virginia
- Tax law and financial law publications from noted sources such as the American Bar Association and American Law Institute
- Global accounting and tax journals from the UK, Canada, Australia, France, Spain, Ireland, and more
- Financial advising, governance, and risk management publications from Incisive Media, CFA Institute, and Association for Financial Counseling and Planning
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